DOCUMENT RESUME

ED 481 705 HE 036 260

TITLE	Energy Management in Higher Education: Value for Money Study.
INSTITUTION	Scottish Higher Education Funding Council, Edinburgh.; Higher Education Funding Council for England, Bristol.; Higher Education Funding Council for Wales, Cardiff.
PUB DATE	2003-00-00
NOTE	113p.; Also prepared by the Department for Employment and Learning (Northern Ireland). Commissioned by the UK Value for Money Steering Group. Contains small print.
PUB TYPE	Reports - Research (143) -- Tests/Questionnaires (160)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	Building Operation; *Conservation (Environment); Cost Effectiveness; Energy Conservation; *Energy Management; Foreign Countries; Higher Education; Policy Formation; Sustainable Development; *Utilities
IDENTIFIERS	*Sustainability; United Kingdom

ABSTRACT

This Value for Money project provides an update of the 1996 "Energy Management Study in the Higher Education Sector: National Report." It reviews the management arrangement for utilities in the higher education (HE) sector, and it identifies key actions and future issues that must be addressed by HE institutions in developing a strategic policy framework for sustainability that includes energy management. Three sections examine: (1) "Utilities Management in the HE Sector" (e.g., sector profiles, specific issues for energy management, monitoring and targeting systems, and technology design); (2) "Sustainability Framework for the HE Sector" (e.g., estates strategy, energy policy, energy management, sources of external funding, and sector initiatives); and (3) "Future Issues" (legislation, drivers for sustainability, energy targets, government bodies, energy service companies, climate change levy, and accountability and assurance). The appendixes include: study background; membership of working groups; participating higher education institutions; communication matrix questionnaire and results; checklists and other resources; glossary, bibliography, and additional sources; summary of ShareFair HE energy management network events; drivers for sustainable estates management in the FHE sector; external drivers for integrating sustainability into estates management in the HE sector; and case studies. (SM)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 481 705

July 2003/**30**
Good practice
Value for money study

This report is for information and guidance

This report, commissioned by the UK Value for Money Steering Group, provides an update of the energy management VfM study completed in 1996 ('Energy management study in the higher education sector: National Report', HEFCE M5/96). It identifies key actions and future issues that need to be addressed by HE institutions in developing a strategic policy framework for sustainability that includes energy management.

The UK Value for Money Steering Group

Energy management in higher education

Value for money study

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY
R. Kier
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
2A

BEST COPY AVAILABLE

© 2003 HEFCE/SHEFC/HEFCW/DEL

HIGHER EDUCATION FUNDING COUNCIL hefce FOR ENGLAND

Management of energy in higher education

Table of contents

	Page
Summary	**2**
1. Utilities management in the HE sector	**5**
Introduction	5
Sector profile 2001-02	5
Sector profile 1999-2000	6
Specific issues for energy management	9
Monitoring and targeting (M&T) systems	11
Technology design	11
Investment in energy management	11
2. Sustainability framework for the HE sector	**12**
Introduction	12
Sustainability framework	12
Estates strategy	13
Energy policy	13
Energy management – developing a business case	16
Sources of external funding – government support for energy efficiency	18
Appointment of energy managers	20
Training and sharing best practice	22
Sector initiatives	23
Energy Consortium web-site	23
Awareness – institution-wide communication	23
3. Future issues	**25**
Legislation	25
Drivers for sustainability	26
Energy targets	26
Government bodies	27
Energy service companies	28
Climate change levy	28
Accountability and assurance	28
Appendices	**30**
A. Background to the study	30
B. Membership of working groups	32
C. Participating higher education institutions	34
D1. Communication matrix questionnaire 2001-02 and results	37
D2. Checklists and other resources	42
E. Glossary, bibliography and additional sources	78
F. Summary of ShareFair HE energy management network events	84
G. Drivers for sustainable estates management in the FHE sector	92
H. External drivers for integrating sustainability into estates management in the HE sector	105
I. Case studies	113

Summary

This value for money (VfM) project provides an update of the energy management VfM study completed in 1996 ('Energy management study in the higher education sector: National Report', HEFCE report M 5/96). Firstly, it provides an overview of the management arrangements for utilities in the HE sector. Secondly, it identifies those key actions and future issues that need to be addressed by HE institutions in developing a strategic policy framework for sustainability that includes energy management.

In 1996, the achievements already made by a number of higher education institutions (HEIs) in the efficient use of energy were readily acknowledged. Some institutions have been actively committed to energy management for a number of years prior to the start of the 1996 study, as shown by their ongoing investment of resources in energy management. For other institutions, the study highlighted that there were real opportunities to be gained from the implementation of a range of energy saving measures. The study stressed that if the management of energy was not seriously considered by these institutions there was a risk that it would be, and continue to be, largely a technical issue rather than a management concern.

Since the 1996 study, further study surveys have been undertaken on energy management in the higher education (HE) sector. Overall, findings support the view that while further progress has taken place within the HE sector, opportunities to implement best practice for energy management issues have not always been taken. Much of the advice provided in the 1996 study is still valid, providing help to institutions in overcoming barriers to progress in energy conservation. The guidance provided in this web-based documentation will be of interest to three groups in particular:

- higher education institutions – members of senior management team and energy management staff
- HE sector bodies – such as the Association of University Directors of Estates (AUDE), the Association of University Engineers (AUE) and the British Universities Finance Directors Group (BUFDG)
- HE funding councils.

HE institutions

The suggested actions in this guidance ought to be actively adopted by all institutions, to deliver value for money. Specifically, institutions now need to consider the following areas:

- developing a strategic policy framework for sustainability, to include energy management issues
- responding proactively, by taking actions in anticipation of impending European directives and UK legislation (investing in best management practice)
- undertaking further investment in energy conservation, taking account of risk management and whole-life costing within business case proposals for capital and maintenance projects
- enhancing management information to inform decision-making – by highlighting the cost-savings benefits that have already been achieved, and the further opportunities available if those savings were re-invested in other energy conservation measures
- adopting a team approach to managing 'energy' that would includes all utilities
- improving the staff development arrangements and the communication channels within institutions, to aid a better understanding of sustainability issues for energy and the environment.

It is suggested that institutions use the checklists 1 and 2 in Appendix D2, to assess the effectiveness of their energy management arrangements. Realistic targets should then be identified to monitor performance over the next three to five years in respect of the following objectives:

- complying with legislation
- aligning with good management practice
- achieving value for money.

HE sector bodies

A number of sector-based initiatives have taken place since 1996. The contribution made by these initiatives is important in terms of knowledge, purchasing energy, performance statistics and good practice.

ShareFair Higher Education Energy Management Network

The ShareFair Higher Education Energy Management Network was established in 1997 to provide a forum for the UK HE sector on energy matters. The network is based on the principle of learning and building on what other energy managers have already achieved. This avoids duplication and facilitates the flow of useful information on technologies and practices that have been successful and ones that have failed. More detail on the Sharefair network is at Appendix F, including a list of materials available on topics it has addressed.

Energy Consortium web-site

A number of HE institutions are members of the Energy Consortium (formerly known as the Consortium for Higher Education Energy Purchasing, CHEEP). Member institutions have benefited tremendously from the advice provided on this web-site in negotiating energy contracts that offer value for money. The web-site also contains links to other energy-related sites.

Awareness – institution-wide communication

Communication is important: in many institutions, responsibility for energy management lies solely with technical or estates staff. This makes it difficult to ensure that the institution's values, aims and objectives regarding the environment and energy issues are communicated on an institution-wide basis. One way that some institutions have managed to get the message across to staff has been to illustrate the savings that they can make in their own homes. It is suggested that institutions use checklist 3 listed in Appendix D2, to identify ways to address communication issues more effectively.

Funding councils

A number of energy management practitioners feel that the statutory framework needs to be supported by a requirement of the HE funding bodies to request information covering energy and other issues, to provide effective accountability and assurance, and to facilitate further changes in energy management within HEIs.

Next steps

Data collection and benchmarking will become increasingly critical issues for HEIs to consider, especially as current methods make comparisons impossible even within HEIs. The Higher Education Environmental Performance Improvement (HEEPI) project is expected to provide benchmarks that can be adopted across the sector (for further details regarding this project, funded as part of the Good Management Practice Initiative, go to www.hefce.ac.uk/GoodPrac/fdgmp/2001/GMP232.htm and www.heepi.org.uk/). If sector-wide agreement about voluntary targets, either in terms of consumption or emissions is not forthcoming, it seems inevitable that targets will be imposed externally. To avoid the negative effects of such a scenario, HEIs are recommended to adopt a risk management approach. A good practice checklist is provided under checklist 2 in Appendix D2.

Inevitably, there have been significant changes since the 1996 study. This report advocates, therefore, that institutions – for their own benefit – identify the actions necessary to address the above concerns.

Structure of the report

Section 1 is an overview of the management arrangements for utilities in the HE sector. Section 2 considers issues that impact on sustainability for energy and the environment. Section 3 identifies the issues that will have an increasing impact on the way that institutions operate in the future. Appendices A to I contain further resources as well as background information.

1. Utilities management in the HE sector

Introduction

This section provides an overview of the management arrangements for utilities in the HE sector, based on the contributions of an expert working group, the results of a questionnaire on communication, and examples of good practice provided by higher education institutions and other organisations. The overall findings were informed by the separate outcomes of the sector profiles for 1999-2000 and 2001-02, and the European Commission study 'Barriers to Energy Efficiency in the UK Higher Education Sector (1998-2000), as outlined below.

Sector profile 2001-02

As part of this evaluation of the 1996 energy management value for money (VfM) study, a questionnaire matrix was distributed on communication issues. It covered strategic policy framework, management responsibilities, motivating and marketing, and training arrangements. The replies received indicated that although progress had been made, the effectiveness of such arrangements continues to vary tremendously between institutions. A summary of the results is given below; further details are available in Appendix D1.

Strategic policy framework

For some institutions, while their energy management arrangements recognised energy efficiency issues, they were addressed in an ad hoc fashion and an energy policy had not been formally adopted by the institution. The majority, however, felt that effective energy management arrangements, including water management, were in place and were documented within an approved policy for the management of all utilities. Some consideration had been given to environmental issues, but arrangements differed between institutions – from no formal environmental policy or management system being in place, to the utilities policy being integrated within the institution's broader approach to implementing an environmental strategy. Few institutions felt that their present arrangements enabled a utilities policy to be embedded in an environmental strategy; in addition, neither the environmental strategy nor the utilities policy were periodically reviewed and updated – say, at least every three years – by a senior committee at their institution.

Management responsibilities

For the majority of institutions, the arrangements in place enabled promotion of energy efficiency to be undertaken on an ad hoc basis, albeit only by the estates and departmental technical staff. These arrangements were sometimes a part-time/shared responsibility for someone in the estates and facilities management departments only. Equally, it was estates department staff who allocated time, resources and expertise to preparing energy proposals, but often there was no formal annual programme. Disappointingly, the replies still meant that responsibility for energy/utilities management lay solely in the estates department, and that energy management was not widely shared or promoted within the institution. For those institutions that had appointed energy managers, the main responsibility of these staff was the procuring and monitoring of utilities consumption, and some promotion of energy efficiency. The replies received also indicated that the senior management team within a number of institutions did not take a proactive approach to support fully the role of the energy management team within a sustainability strategy. Similarly, utilities monitoring, management and reporting were not fully integrated into senior management committee cycles, with little positive feedback being given to the energy management team.

Motivating and marketing

The replies received supported the view that this aspect of energy management is often ignored by many institutions. Many indicated that there was some promotion of energy issues, but nothing regular or targeted, and that while there was ad hoc staff awareness training given by estates staff, this was not part of a staff development programme. Some institutions replied that an energy or environmental committee was the main

channel for management reporting, together with direct contact with major energy users in their institutions. Only a small number of institutions replied that there was clear delegation of responsibility for utilities consumption – with targets, monitoring and management reporting/feedback being provided to energy consumers. Similarly, only a few institutions marketed the value of environmental protection, energy efficiency and the performance of utilities management within the institution and outside it.

Training arrangements

The majority of institutions stated that professional and technical journals were scanned on an ad hoc basis for information on the latest developments in energy efficiency, and that trade journals, literature and other sources were studied for energy implications when replacing and purchasing new equipment for the institution. Some institutions indicated that there were limited training opportunities available to estates, departmental technical and energy management staff to develop, and to acquire, further skills in support of their energy management responsibilities. Only a small number of institutions replying felt that their institution provided an active technical library, containing both web-based and printed environmental, domestic and non-domestic energy efficiency materials. Similarly, only a few felt that continuous and comprehensive professional development was arranged for all estates, departmental technical and energy management staff within the institution, to support energy awareness actions.

The above findings demonstrate that further improvements are still to be made by a number of HE institutions, particularly in view of the encouraging findings obtained in 1999-2000, when a survey evaluation was undertaken to identify the progress achieved by the sector since the publication of the national report. The 1999-2000 findings are summarised in Table 1.

Sector profile 1999-2000

Following publication of the 1996 energy management reports (HEFCE M 5/96 and M 16/96), a number of higher education institutions enhanced their energy management arrangements. A questionnaire survey provided the results shown in Table 1, relating to improvements made.

Table 1 Summary of findings of 1999-2000 survey evaluation of energy management by HEIs

Improvements made – changes introduced by institutions since the publication of the energy management reports in 1996	**Institutions' responses – Number of replies (positive changes achieved %)**
Signed up to the Department of the Environment's 'corporate commitment' initiative since March 1996?	18 (12% increase since 1996)
Staff attend BRECSU and ETSU energy workshops and training events?	54 (37%)
Implementation of BREEAM processes?	23 (16%)
Implementation of energy policy since March 1996?	38 (26%)
Policy linked to its estate strategy and environmental policy?	40 (28%)
Policy contains specified objectives and performance measures for the management and conservation of energy?	32 (22%)
Appointed an energy committee since March 1996?	25 (17% increase since 1996)

BEST COPY AVAILABLE

Improvements made – changes introduced by institutions since the publication of the energy management reports in 1996	Institutions' responses – Number of replies (positive changes achieved %)
Committee responsible for updating, implementing and monitoring the energy and environmental policies?	32 (22%)
Committee identified, developed and implemented arrangements to help institution manage its energy resources and increase environmental awareness among staff?	27 (19%)
Committee responsible for reporting and disseminating energy management information to the management team and to staff/students?	27 (19%)
Appointment of energy manager since March 1996?	35 (24%)
Energy manager responsible for identifying, developing and implementing arrangements to help institution manage its energy resources and increase environmental awareness among staff?	56 (39%)
Energy manager responsibilities include acting as change-manager/liaison officer for good energy practice?	54 (37%)
Estates (and other) staff responsibilities include acting as change-manager/liaison office for good energy practice?	57 (39%)

The national report, published in 1996, indicated potential savings of between 10 and 20 per cent. Such savings would be achieved by HEIs through a mixture of cost savings (linked to good procurement arrangements, beneficial changes in the prices of utilities, and so on), and the adoption of better energy management practices.

Analysis of the energy cost data during the period 1995 to 1999 indicated that electricity prices rose in 1998 to 3.93p/kWh and then 4.97p/kWh against falls in previous years. Prices then continued to fall during 1999. The position regarding gas prices was that prices rose in 1997 to 14.90p/16.45p per therm and in 1998 to 20.40p/21.73p per therm against falls in previous years. Gas prices, like those for electricity, then continued to fall during 1999. The average increases for water and sewerage services rose by 21.7 per cent and 25 per cent respectively during the same period (1995 to 1999).

Since the original survey in 1999-2000, 69 institutions (42 per cent) reported energy savings of approximately £12.5 million (10.5 per cent). It was concluded therefore, that:

- those HEIs reporting savings in excess of 10 per cent (41 per cent of replies) probably did so through a mixture of good procurement and good energy management processes
- those HEIs reporting savings of less than 10 per cent (59 per cent of replies) probably did so mainly or solely through good energy procurement arrangements.

On an HE sector level, these results indicate that there is further scope for savings to be made, ie, as a result of good procurement and energy management arrangements.

BEST COPY AVAILABLE

In addition to the surveys undertaken by the funding bodies in 1999-2000 and 2001-02, a study was funded by the European Commission during 1998 to 2000 – 'Barriers to Energy Efficiency in the UK Higher Education Sector'. This study also drew on the experience in Ireland and Germany. The findings are summarised below; the web link to the full report is given in Appendix E, *Glossary, bibliography and additional sources*.

Barriers to energy efficiency in higher education – summary findings of a European Commission study

Universities are large organisations with complex decision-making structures and with organisational practices heavily influenced by public sector rules (for example, financial accounting, equipment purchasing). Energy using technologies and efficiency opportunities are largely buildings related (heating, lighting and so on). Most universities have major capital programmes which makes the energy efficiency of new buildings of particular importance. In the UK, Ireland and Germany, five or six case studies were conducted of energy management practices within individual universities. Some of the main results are summarised below.

Energy management practices in higher education

Common features of the organisation of energy management in the case studies in Ireland, Germany and the UK include the following:

***Organisation**: Energy management was very much a technical exercise, centralised in the estates department and legitimated on cost saving grounds. In Ireland and the UK, the bigger institutions had a full-time energy manager. The majority of energy efficiency improvements derived from routine maintenance, new build and refurbishment.*

***Energy and environmental policy**: Institutions with an established energy policy that included quantitative targets were in the minority. Several institutions had environmental policies, but these had little impact on energy efficiency.*

***Energy information systems**: These varied widely in quality between rudimentary to best practice. Use of building energy management systems (BEMS) also varied from basic to extensive. Comprehensive information systems and standardised BEMS are prerequisites for effective energy management.*

***Accountability and incentives**: Few institutions charged departments for energy use, with utilities costs either being included within general overheads or charged on the basis of space occupied. There were major internal obstacles to the introduction of 'devolved budgeting'.*

***Capital budgeting and investment criteria**: Over half the institutions had a dedicated budget for energy efficiency investment, although this was a secondary source of energy efficiency improvement. Investment criteria usually fell in the range of two- to five-year paybacks, with no use of an internal rate of return (IRR).*

***New build and refurbishment**: All institutions had major ongoing capital programmes, and all reported a wide range of barriers within the construction process which acted to substantially undermine the energy efficiency of new and refurbished buildings. These derived from the strict adherence to capital budgets and the organisation of the construction industry, including the incentives placed upon the different organizations involved (ie, sector organisations).*

***Purchasing and policy integration**: None of the institutions had been successful in integrating energy*

BEST COPY AVAILABLE

concerns into purchasing policy, and all gave examples of where energy efficiency opportunities had been lost. The use of whole life costing was limited.

***Awareness and culture**: The level of energy awareness among staff and students was uniformly reported to be poor. The importance of a high level 'policy champion' in achieving results was clearly demonstrated.*

***Energy management and outsourcing**: There was considerable scepticism about the value of energy service contracts, with particular concerns about union opposition.*

Key policy initiatives for higher education

Much can be achieved at the organisational level through adoption of best practice energy management procedures, including improved controls and efficiency standards for new buildings. These may be encouraged by the funding bodies for the sector through measures such as mandatory reporting of energy performance, inclusion of energy management in audit criteria and capital funding for cost-effective energy efficiency projects. Also important is the requirement for whole life costing within public procurement rules. Parallel initiatives are required within the construction industry, including the encouragement of integrated design and a move away from cost based competitive tendering. Broader initiatives at the national level which may assist the sector include revenue neutral energy taxation, tighter regulations on the energy performance of new buildings, and market transformation programs for common items of equipment such as personal computers.

Common problems identified by the sector profile study surveys included lack of investment and allocation of resources in energy saving measures, and an absence of a strategic policy framework containing specific performance measures, aims and objectives for the management of energy and other utilities.

The 1996 study also identified barriers to energy efficiency in HEIs. These are considered as specific issues relating to energy management and are outlined below.

Specific issues for energy management

Changes in the HE sector

In addition to the data collection and energy market-led changes detailed in this section, other factors have had to be accommodated in managing energy consumption and cost. For example:

- increase in student numbers
- impact of IT in building design and the increased sophistication of equipment used
- energy-intensive equipment, for example fume cupboards
- intensity of building use – 24-hours operation
- diversification of academic activities
- increased complexity of research activity.

Energy market

Since 1996, the energy market has been restructured and the New Energy Trading Arrangements (NETA) have been introduced. One benefit has been that smaller sites (under 100kW) can now contract their energy requirements more competitively.

BEST COPY AVAILABLE

Under NETA all utilities are tradable commodities, which may be foreign-owned but are subject to UK law. Costs associated with utilities are often volatile, which makes it difficult for institutions to predict and manage utilities budgets accordingly. Online trading for energy contracts has also meant that institutions now have to respond more quickly in accepting new contractual arrangements, often in a matter of few hours.

Across the sector, in excess of £200 million each year is spent on utilities, including water (source: EMS Annual Report 2002). Water supply is still subject to regulation, and for many institutions water costs are greater than other utility costs. Since water costs are now significant for institutions they should be given the same consideration as other utilities. Future energy consumption statistics will probably require reporting of carbon consumption as well. This will require HEIs to consider the sources of the energy they procure, such as green electricity, as well as the means of delivering heat, coolness and power to their estates.

Changes in data collection

A further change following deregulation of the energy market has been the faster availability of fiscal meter data. These data are now accessible on-line from the energy supplier on a half-hourly basis, which enables institutions to monitor and target campus buildings more easily than in the past. However, some institutions have found it difficult to manage the resulting information overload or to take action on the findings. Additionally – in spite of this information, and accepting that some institutions provide extracts on their energy web-site - only few institutions provide meaningful information to senior management, or in support of bids for funding.

Development of management information and reporting performance statistics

The 1996 report provided guidance benchmarks that were derived from data collected over three months from approximately 20 institutions. These data indicated utilities consumption for a number of building types and building uses. Since that time, several initiatives have examined benchmarking of utilities consumption. The Estates Management Statistics project (EMS) began by considering utilities cost and other data across the whole higher education sector. Data on utilities consumption for 1998-99 to 2000-01 are shown in Table 2. These indicate an overall reduction in consumption by the HE sector. Comparable data do not exist for 1994-95 (the year on which the 1996 study was based). It is therefore impossible to extrapolate backwards. However, information obtained from institutions that have been monitoring energy cost and consumption since 1995, also indicates a reduction in energy consumption. This trend is encouraging at a time when student numbers are increasing and there is increased usage of campus buildings.

Table 2 Utilities consumption data in UK HEIs, 1998-99 to 2000-01

KWh per sq.m. (GIA)/reporting year	Lower quartile	Median	Upper quartile
1998-99	254	299	378
1999-2000	239	289	336
2000-01	243	277	333

Table 2 indicates reductions in energy consumption between 1998-99 and 2000-01 of 4.33 per cent (lower quartile), rising to 11.90 per cent (upper quartile). The median decrease was 7.36 per cent.

The HEFCE good management practice project GMP 232 – 'Environmental performance improvement and benchmarking in HEIs' (the HEEPI project) – is looking at the EMS data and developing detailed performance indicators at an individual building level. These performance indicators are likely to include ones for correction of consumption data by degree-days, to compensate for building locations within the

12 BEST COPY AVAILABLE

country, and for hours of occupation of buildings. The project is looking at building use and the effect of level of research activity on building utilities consumption. The project will also provide opportunities for analysis of data in terms of building age, building location and method of construction. It is due to report in August 2003.

The outcomes of the HEEPI project should contribute greatly to this evaluation of the original VfM study, if it provides a more defined range of benchmarks that will be more usable by institutions in the HE sector.

Monitoring and targeting (M&T) systems

These are integrated component parts of Building Management Systems and Energy Management Systems. Institutions will need to have arrangements to obtain and manipulate data from a number of sources. For example, own data operation of specific buildings, utility supplier on-line consumption data, HE sector and market-based comparatives. To inform decision making, institutions should ensure that they have an M&T system in place.

Technology design

Building controls have become more sophisticated; it is now possible to operate building management systems on-line via institutions' IT networks. As part of space management, timetabling for teaching and research facilities is now possible. In any new building project, or major refurbishment project, it is important that energy management input is provided at the design stage. There are numerous examples of where energy management measures have been excluded on the grounds of cost. This has sometimes resulted in expensive retrospective fitting of equipment. The lack of consultation and the non-awareness of design standards and protocols for energy-related equipment, costs time and money.

Investment in energy management

Some energy managers have found it difficult to gain the support of senior colleagues to invest in energy initiatives or re-invest any savings achieved into further energy conservation measures. For example, this may be because the implementation of energy saving measures is part of a larger capital project, and it is difficult to identify the energy cost and savings elements within such new-build or refurbishment projects. The multi-occupancy of academic buildings and the absence of sub-metering data for such buildings have also contributed to a lack of management information and the lack of investment regarding operation of these facilities.

To support further investment in energy conservation, the expert working group (see Appendix B) has developed advice and examples of preparing a business case for energy management measures (see *'Energy management – developing a business case'* on page 16 and Appendix D2, checklist 4). Institutions may also find helpful *'Appraising investment decisions'* and *'Repair or replace decisions'* checklists (Appendix D2, checklists 5 and 6).

2. Sustainability framework for the HE sector

Introduction

Since 1996, the agenda for energy management has broadened and the issues facing institutions are more complex. In this section, consideration is given to issues that impact on sustainability for energy and the environment.

Two working groups, the Project Management Committee (PMC) and the Expert Working Group (EWG) – a group of energy and management representatives from the sector – felt that issues linked to sustainability had become increasingly important since the publication of the 1996 report. As part of this study, the EWG developed guidance checklists and schedules for use by HE institutions (see Appendix D2, *Checklists and other resources*), so that HEIs can assess their present arrangements and identify further improvements in the areas linked to strategic policy development and investment appraisal. The issues raised are discussed in this section.

Sustainability framework

There is a growing realisation and acceptance that all sectors in society need to be more responsible and concerned about their impact on the environment. This is reflected in the increasing amount of UK and European legislation/directives, and in the policies of national and local Government. These actions embrace social, ethical and economic issues along with environmental issues under the umbrella concepts of sustainability and sustainable development.

As part of the above, a number of 'energy targets' have been identified in various sectors (listed under Table 6 – *'Energy targets for the private and public sectors'* on page 26). These have been:

- agreed during negotiated agreements for Climate Change Levy rebates
- set by Government, or
- adopted voluntarily by the sectors concerned (for example, hotels and hospitality).

The Department of Transport and the Regions' (DETR's) document 'Climate Change, the UK Programmes', indicates that carbon emissions will be reduced by 10 per cent (from 2000 levels of 1 MtC by 0.1 MtC in 2010). The White Paper 'Our energy future – creating a low carbon economy' (February 2003) contains government proposals for developing cleaner, greener energy. It details a strategy to reduce harmful carbon emissions over the next 50 years, with major expansion of renewable energy and energy efficiency. The document sets out four goals for the Government's energy policy:

- to work towards cutting emissions of carbon dioxide by 60 per cent by 2050
- to maintain the reliability of energy supplies
- to promote competitive energy markets in the UK and beyond
- to ensure that every home is adequately and affordably heated.

The range of practical measures includes:

- an ambition to double the share of electricity from renewable sources by 2020, from the existing 2010 target of 10 per cent
- £60 million in new money for renewable projects, bringing spending on renewable energy up to £348 million in total over four years

- reforming planning rules to unblock the hurdles to renewable energy
- a new carbon trading system to come into effect from around 2005, that will give energy suppliers and consumers incentives to switch to cleaner energy
- speeding up changes to building regulations and setting tougher standards for energy efficiency in new homes, refurbishments and electrical products.

The umbrella concepts of sustainability and sustainable development are already affecting many aspects of life which are far from political. For example, planning legislation; university curricula in virtually all faculties; and design, manufacturing and management guidance in many sectors.

The HE sector needs to consider establishing now a general energy and environment strategy that encompasses not only operational issues, but also procurement and the disposal of buildings and materials. Failure to do so may have serious impact on their operations.

The members of the EWG considered it important that energy management should include all utilities; this included water-related services. It was felt by the group that environmental issues, such as transport and waste recovery, were a separate issue. The expert working group established that energy and the environment should be treated as separate but complementary issues by an HEI's senior management team. By keeping management responsibilities for each separate, the management agenda for energy and the environment would be more manageable, and separate resources for each could be identified more easily. Together, they would form part of a sustainability strategy. This study focuses on the energy management issues.

The following matters are considered to be important elements in underpinning the sustainability framework:

- development of an estates strategy
- implementation of energy and environment policies
- compliance with energy related legislation and taxation, for example, the climate change levy.

Estates strategy
Samples of institutions' estates strategies have not been examined by the expert working group as part of this update. However, as part of best management practice, the institution's estates strategy should include links to energy management and building maintenance arrangements.

Energy policy
As might be expected, the adoption of an energy policy by HEIs has increased since 1996, following the last review of energy management in universities and publication of the HEFCE report M 5/96, 'Energy Management Study in the Higher Education Sector: National Report'. Energy policies exist, but are limited in their effectiveness as useful documents. Adoption of energy policies does not of itself signal best management practice. The Expert Working Group (EWG) reviewed a representative sample of policies that demonstrated the implementation of good practice. The web page links for these energy policies are given below under *3 Further examples of energy policies*.

In the sample of energy policies reviewed, all institutions established two important strategic elements:

a. A comprehensive energy policy covering the management of all utilities, that forms an integral part of and is updated in line with institutions' corporate plans. These are typically reviewed every three to five years.

b. An energy plan covering the implementation and monitoring of clearly defined annual objectives and performance measures.

Both the policies and plans clearly define responsibilities and ensure effective performance evaluation.

To maximise the tangible and intangible benefits for all HEIs, the EWG recommends that institutions reassess the effectiveness of their present arrangements in the light of the comments above. Institutions may find the guidance given below under *'1 The energy policy'* and *'2 Energy plan'* helpful in conducting this review.

1. The energy policy

This document should set out those 'enduring elements' identified by an institution and underpinning its corporate commitment to managing all utilities, in accordance with an assessment of risk, legislation and best practice guidance. Ideally, the policy will be forward-looking, taking account of planned and possible future regulatory frameworks.

The policy should include:

- defined key strategic aims and values: the statements made should link clearly with the institution's corporate plan
- assessment of risk: this is an increasingly important dimension of energy policies, and institutions should ensure that arrangements are in place regarding risks to energy supplies; use of alternative energy sources; impact of UK government energy taxation policies; EC guidelines and directives
- involvement and responsibility: this should be at both corporate and personal levels, defining awareness, the commitment and responsibilities of the corporate body and individual members of the HEI.

  The EWG accepts that HEIs vary considerably and no single management structure fits all cases. However, each HEI should establish a management responsibility structure, which might include:

  - the responsibilities of the senior management team and major committees
  - appointing or defining an energy management team that could include professional staff (energy engineers, and so on), professional advisers, liaison representatives (including user departments and recognised trades unions) and collaborative arrangements with other public sector organisations
  - defining the personal responsibilities of staff and students.

- implementation of legislation and best practice guidance: this should include a statement of the institution's approach to dealing with current and future legislation and define the key reference points for adoption and implementation of best practice. Institutions are recommended to identify sources of best practice, arrangements for keeping staff up to date and training, and external funding implementation. Sources of information might include the Association of University Directors of Estates (AUDE) and the Association of University Engineers (AUE).

Good practice example

One HEI set itself the task of implementing all relevant Best Practice Programme guidance (Department of the Environment) within two years of publication.

BEST COPY AVAILABLE

2. Energy plan

This short-term operational plan should cover arrangements for the following:

- performance monitoring and reporting, target setting and communication – HEIs should define a monitoring and target programme, which sets out all energy related project initiatives together with monitoring criteria. In addition, arrangements should be defined for performance management, including data capture, specific targets and management reporting
- energy awareness campaigns and training, which should define the training needs of the energy management team and of those with overall responsibility for energy management in the senior management team
- energy purchasing arrangements, including available sources of energy, possible improvements in supply, ongoing risk assessment of maintaining continuity and cost of supplies, and the impact of emerging energy technologies
- operational: which should include energy-related matters and projects in maintenance programmes, as far as practicable adopting an energy-efficient design specification, monitoring and compliance with legislation
- investment arrangements: institutions are recommended to adopt investment appraisal arrangements and to consider adopting whole life costing methodology. Possible arrangements for developing business cases for investment in energy programmes are defined on page 16 under '*Energy Management – developing a business case*' and in Appendix D2, checklists 4 to 6.

Case study – University of Edinburgh

The University of Edinburgh has developed complementary sets of policies and plans relating to key areas of performance, such as energy, waste reduction, health and safety, and travel. Each of these policy headings sits within a coherent management framework provided by an overall sustainability policy, adopted by the university's Court in June 2000.

Within its policy, the university identifies sustainable development as 'development meeting present needs without compromising the ability of future generations to meet their own needs'. Sustainability is a process of ensuring the wise use of all resources within a framework in which environmental, social and economic factors are integrated. It is committed to placing sustainability at the heart of its mission by:

- making sustainability integral to the delivery of research, teaching and operational objectives
- taking positive actions promoting continual environmental improvement
- setting and achieving clearly defined sustainable development objectives and targets.

Specifically, the university has undertaken to:

- make sustainability a corporate priority
- develop and deliver appropriate teaching and research
- take a leadership role in sustainability
- contribute to stable community building
- maintain and develop the university in a sustainable manner
- monitor and report on progress towards sustainability.

BEST COPY AVAILABLE

3. Further examples of energy policies

The Expert Working Group (EWG) recognises that the above suggestions are for guidance only. Institutions may find it useful to refer to other examples of energy policies; some are listed below.

City University: www.city.ac.uk/estateservices/energy.htm

Durham's environmental policy: www.dur.ac.uk/%7Edcm0www/policy.htm

Edinburgh's policy statement:
www.estates.ed.ac.uk/PROCEDURES/WORKS/Guidelines/Sustainability%20Guidelines.htm

Essex has an energy policy www2.essex.ac.uk/energy/Energy%20Policy.shtm and an environmental policy: www2.essex.ac.uk/energy/environment.shtm

Glasgow has a policy on energy management: www.gla.ac.uk/events/energy/

Leeds Metropolitan: www.lmu.ac.uk/fin/envmnt/op/engwat/policy.htm

Loughborough: www.lboro.ac.uk/admin/hse/epappen6.html

Nottingham Trent: www.ntu.ac.uk/green/policies.htm

Sheffield: www.shef.ac.uk/estates/energy/energy_policy.htm and
www.shef.ac.uk/estates/energy/energy_enman.htm

Sheffield Hallam: www.shu.ac.uk/services/facilities/sustainability/index.htm

Sunderland: http://cei.sunderland.ac.uk/USER/energypol.htm

Ulster: http://intranet.ulst.ac.uk/phyres/estates/energypolicy.html

Other schemes of interest:

Birmingham: www.estates.bham.ac.uk/utility/

York is currently developing an energy policy: http://www1.york.ac.uk/inst/sei/energy/matters.htm

Energy management – developing a business case

Members of the EWG felt that energy conservation measures should be subject to the same financial rigours as other calls for funding by institutions. This section addresses the concept of developing a business case, and its importance in the decision-making process within institutions. Further, it provides guidance to energy staff and others responsible for preparing cases and sourcing funding. It is not prescriptive – every institution will have particular processes and styles that their staff will have to follow. Rather, it indicates the sorts of issues that should be explored within a business case. Examples from institutions are provided in the first two case studies at Appendix I.

Why have a business case?

Institution decision-makers face increasingly tough decisions on how to allocate scarce resources, both human and financial. The investment proposal must therefore demonstrate that it offers value-for-money to the institution – this applies equally to requests for additional staffing as it does to requests for capital

equipment. Adopting a business case approach should ensure that those responsible for allocating resources have all the information necessary when making their decision on investment projects. Business cases can vary in format, but all will include financial projections and an impact/benefit analysis – both of which are key in assessing value-for-money overall.

Preparing a business case

The following are the key elements that would normally be included in a business case:

a. *Executive summary* This should summarise the key points of the proposal and include explicitly the resources that are being requested and the benefits that will accrue.

b. *Description of the project/investment* This would be a short but precise description of the project. It should summarise for management why the proposal is being made (draw particular attention to any compliance/health and safety issues, if relevant, and to links with the strategic priorities and institutional drivers), the nature of the investment/project (what is being purchased/requested), what it will do and the benefits it will bring, and where it will impact within the institution. This last point is important in allowing senior management to judge the spread of benefits.

c. *Current position* This section should give any relevant background knowledge that readers will require, plus a brief description of what happens currently. It is important that senior management are able to judge whether what is proposed is a replacement, part-replacement or new investment altogether. If it is a proposal for a replacement and it is essential, then make this clear – for example, by indicating the state of the existing equipment in the case of a capital replacement proposal. See Appendix D2 checklist 6 – *Repair or replace decisions checklist.*

d. *Options appraisal* This section should detail the alternative options that have been considered, including that of doing nothing. The primary purpose of the options appraisal is to select a solution which optimises value for money within the overall constraints of affordability and achievability. Here it is important to highlight the additional benefits that each option might bring – it is suggested that these need to be considered across the whole lifetime of the project. Any assumptions about the external operating environment should be included here. See Appendix D2 checklist 5 – *Appraising investment decisions checklist.*

   For each option, there should be a list of assumptions made, benefits analysis, financial analysis, sensitivity analysis and risk analysis. From these, it should then be possible to do an economic analysis, ie, compare costs with anticipated benefits and so derive value-for-money comparisons.

   The financial analysis needs to take account of the total outlays for the project. These may include, for example, one-off capital outlays, revenue costs and professional fees for advisers. On the positive side, the proposer needs to identify the financial benefits that will flow. These may come in different forms; for example, as savings that will accrue from making the investment (such as CHP, combined heat and power), ongoing current actual revenue savings, sale of existing assets. It is also important to include the residual value of new assets at the end of the investment appraisal period. As expenditure and savings may occur throughout the period of the investment proposal, adjustment will have to be made for the relative cost of money into the future – this is done by discounting net future cash flows back to the present day. Finance staff in institutions will be able to advise should energy managers require assistance.

The sensitivity analysis is critical and may relate to all aspects of the proposal, for example costs, returns, capital machinery performance and savings. Essentially, the sensitivity analysis gets the proposer thinking about the range in which costs and returns might lie. For example, anticipated energy savings may vary by plus or minus 10 per cent, which could have a bearing on the attractiveness of an investment option for senior management. For both benefits and risks, it is important to consider both quantifiable and non-quantifiable aspects – for the non-quantifiable aspects, some scoring mechanism is needed to assess relativity between the options, for example, high, medium, low.

Finally, taking into account the conclusions of the options appraisal, a preferred option is proposed.

In evaluating the benefits associated with energy management projects, it is suggested that whole life costing (or Life Cycle Costing Analysis) is the most appropriate and effective tool to use. A description and consideration of the use of life cycle cost analysis as a possible method of project evaluation can be found in Appendix E, *Additional sources – international,* under *'Life Cycle Costing Manual'*.

e. *Monitoring and evaluation* Once a preferred option has been identified, it is usual to indicate how the overall project will be monitored and evaluated. Within this, the proposer may wish to consider including ways in which expenditure and savings will be monitored, and how the overall effectiveness of the project will be measured. While the monitoring of expenditure in the period of getting the project up and running may be fairly easy to identify, less easy may be monitoring ongoing net savings that may accrue from the investment. This is because other factors that may impinge on savings will have to be taken into account, such as efficiency ratings of ageing plant and equipment, and some measure needs to be determined accordingly.

Helpful information

A *'Business case template'* is available – see Appendix D2, checklist 4.

Sources of external funding – government support for energy efficiency

A number of government initiatives support and encourage energy efficiency within higher education, and on a wider basis. The funding ranges from information and awareness programmes to free or subsidised surveys and grants schemes. The main initiatives that are available at the time of writing are summarised below under Table 3 – *Government initiatives that encourage energy efficiency within higher education.*

Table 3 Government initiatives that encourage energy efficiency within higher education

Scheme	Organisation	Details	Web-site
Action Energy	Carbon Trust	Free publications, training events (including HE network events such as Sharefair), promotional material, software.	www.actionenergy.org.uk/
Action Energy	Carbon Trust	Site Surveys – up to 5 days available for general energy surveys, with up to a further 5 days for assessments of specific issues.	www.actionenergy.org.uk/
Action Energy	Carbon Trust	Design Advice – one day consultation for new-build and refurbishment projects (minimum floor area of 500m^2), with 30% support available for ongoing advice (if required).	www.actionenergy.org.uk/
Market Transformation Programme	DEFRA	Database of energy consumption (and other information) for a range of products including PCs, laptops, TVs, refrigeration and domestic equipment.	www.defra.gov.uk/environment/consumerprod/mtp/index.htm and www.mtprog.com/ www.defra.gov.uk/environment/consumerprod/ecolabel/index.htm
Community Energy Programme	EST/Carbon Trust (for DEFRA)	Grant scheme for capital investment in community heating schemes and for development projects (eg, feasibility studies).	www.est.org.uk/commenergy/
Clear Skies	DTI	Grant scheme (50% funding) for investment in five specific renewable energy technologies other than photovoltaics.	www.clear-skies.org/
Solar Grants	DTI	Grant scheme (40-65%) for investment in photovoltaics.	www.est.co.uk/solar/

The web-site www.inreb.org/showpage.jsp?page=funding.jsp includes software that identifies available sources of funding for a range of activities, including energy and environmental measures. It is updated on a regular basis. Examples of funding received under the Community Energy Programme are given under Table 4.

BEST COPY AVAILABLE

Table 4 Community Energy Programme Funding

The Community Energy Programme provides funding, information and support to local authorities, housing associations, universities, hospitals and other public sector organisations for the creation, extension or refurbishment of community heating schemes. Examples of successful 'Pathfinder' applications by HEIs are given below. See also www.energysavingstrust.co.uk/commenergy/pathfinders.doc.

UMIST £533,499

The University of Manchester Institute of Science and Technology has two major campuses: the main campus and the Grosvenor site. UMIST will extend its existing heating network to include the Grosvenor site and install 3.9 Mwe of CHP, back up boilers and absorption chilling capacity providing cooling as well as heating. A range of buildings will benefit from the grant, covering a total floor area of 236,147 m². The scheme will save over 3,250 tonnes of carbon per annum. The university will realise more than £270,000 savings on its annual fuel bill.

University of Edinburgh £1,630,948

The University of Edinburgh proposes to replace an existing steam infrastructure which is near the end of its life and install a 2.7 Mwe CHP scheme. More than 30 university buildings, with a floor area of 122,251 m^2, will benefit from the grant. Over 2,130 tonnes of carbon will be saved per annum. This represents a total annual fuel bill saving of more than £222,000.

University of Dundee £50,000

The University of Dundee is constructing a new 9,600m² science laboratory on campus. This new building will require both heating and cooling. The proposal is to use the heat provided by an existing 3 Mwe CHP (heat which is currently being dumped) and extra heat generated by running the units at higher outputs, to provide both the heating and cooling demands. The scheme will save over 100 tonnes of carbon per year. The University of Dundee will save more than £24,000 on its annual fuel bill.

University of Warwick

The University of Warwick applied for a grant to extend its existing heat network and to upgrade its energy network to include CHP. Warwick's existing heat network services mainly academic buildings, with the halls of residence using individual gas fired boilers. The extension will link the academic buildings and the halls of residence and supply them all via CHP. The scheme will result in an annual carbon saving of 1,817 tonnes, which equates to an overall public sector saving of £247,825 per annum.

University of Edinburgh

With the Community Energy funding, the University of Edinburgh can update its heating network to include a CHP system. This new network will serve the main hall of residence, Pollock Hall, which consists of 10 blocks, providing 2,069 study bedrooms. The annual carbon saving for this scheme will be approximately 354 tonnes per annum, equating to cost savings of approximately £56,650 a year.

Appointment of energy managers

One of the successes of the 1996 study was that a number of institutions appointed a dedicated energy manager. The management review guide (HEFCE publication M 16/96) proposed a scale of appointment that linked the number of dedicated energy staff to the total annual energy spend. However, experience gained from the current study has shown that managers were often diverted to focus on areas other than energy. Areas that would benefit from further attention include improving the quality of management

BEST COPY AVAILABLE

information, organising energy awareness campaigns, seeking support for the investment of energy projects and re-investment of savings achieved.

To be successful, an energy manager needs a range of skills. It is unlikely that all of these skills will be found in one person. The findings of this study indicate that a greater level of success is likely to be found from management arrangements allied to adopting a team approach. This reflects the current arrangements in many institutions, ie, where an energy manager is supported by technical advice from colleagues in the estates department, finance department and, where appropriate, external contractors. These may range from arrangements that are totally in-house to those that are totally externally contracted. However, within each of them it is important to have co-ordination and communication between the various managers and professional advisors. Members of the Expert Working Group have developed a matrix for institutions to identify the pool of resources required to manage their energy arrangements effectively (see Table 5). The matrix suggests the relative advantages and disadvantages of such arrangements. Institutions need to review their present arrangements; otherwise the gains and opportunities from energy management will not be fully realised.

The range of arrangements indicated in Table 5 are all appropriate for institutions, subject to other factors being equal. Numerical indicators have been used ranging from 1 to 4, with 1 representing a preferred option.

Table 5 Matrix of arrangements for dealing with energy management within HEIs

Features	**Full-time energy manager**	**Split in-house responsibilities**	**Partly outsourced**	**Fully outsourced**
Focus on issues	1	2	4	3
A team of people to address a problem	2	1	2	4
Ownership of outcomes	1	2	3	4
Size of energy team	4	3	2	1
(Suitable for) size of HEI	Large – medium	All	All	All
Range of expertise available	3	2	1	3
Capacity	4	2	2	1
Flexibility/accommodates variability	3	1	2	4
Continuity	1	2	3	4
Credibility	1	1	2	2
User contact	2	1	3	4

The success of the arrangements indicated in Table 4 will be more assured if they are also underpinned by the involvement of a senior management champion within an institution and/or where the senior management team takes energy management seriously.

BEST COPY AVAILABLE

Training and sharing best practice

Energy managers in the HE sector come from a wide range of backgrounds. Within a number of HEIs, there are a range of energy/environmental related degree courses available. In addition, the Institute of Energy manages a range of training courses up to NVQ level 4.

The following list indicates the range of responsibilities and training provision for energy managers. The intention is to underline the importance of energy managers undertaking continual professional education and development.

Professional background

Educational – degree/NVQ
Professional – engineering/environmental/energy

Training and development provision

Institute of Energy
Professional bodies
ShareFair higher education energy management network
Action Energy (formerly BRECSU) guidance
UK and European legislation

Professional and trade

Journals
Exhibitions
Suppliers

Functional responsibilities

Marketing of energy awareness
Project management and procurement
Investment appraisal and operational documentation
Whole life costing
Obtaining grants and budget management
Design and waste management
Technical
Data management
Business case
Energy modelling
Reporting
Target setting

Institute of Energy – training

Professional development – PD personal plans
CPD – Manual in Energy Management; Training in EM through Open Learning (TEMOL); NVQ4 Managing Energy.

The majority of training undertaken by energy management staff is predominantly in-house. There is also an opportunity for sector organisations, such as HESDA and AUDE, to commission training.

BEST COPY AVAILABLE

Sector initiatives

A number of sector based initiatives have taken place since 1996. The contribution made by these initiatives is important in terms of knowledge, purchasing energy, performance statistics and good practice.

ShareFair Higher Education Energy Management Network

Since 1996, learning from others has progressed greatly in the form of networking, events, sector groups, meetings and e-mail discussion. The ShareFair Higher Education Energy Management Network was established in 1997. There are 130 members registered, representing 110 organisations out of 140 universities in the UK. Wider participation in these events is encouraged.

The network is based on the principle of learning and building on what other energy managers have already achieved. This avoids duplication, with its associated cost and time lost, while facilitating the flow of useful information on technologies and management practices that have been successful and reasons why others may have failed.

The network employs the following communication routes to achieve this:

- ongoing exchange of information between members, by fax and e-mail
- direct contact between members
- three workshops a year, each adapted to address topics raised by attendees that are of interest to members.

A searchable index of e-mail correspondence is at www.jiscmail.ac.uk/lists/energy-management.html, or select 'Discussions, Energy Management' from the Higher Education Estates web-site (www.heestates.ac.uk). Copies of the notes from workshops are available from networks@bre.co.uk. Extracts of ShareFair events are listed at Appendix F.

Energy Consortium web-site

A number of HE institutions are members of the Energy Consortium (formerly known as the Consortium for Higher Education Energy Purchasing, CHEEP). Member institutions have benefited tremendously from the advice provided on this web-site in negotiating value for money, energy contracts. The web-site contains links to the FHE Action Energy and other energy-related sites, and is at www.energy-consortium.com.

Awareness – institution-wide communication

In a number of institutions, responsibility for energy management lies solely with technical or estates staff. Energy managers, in particular, find this responsibility difficult to discharge on behalf of their institutions. To communicate the institution's values, aims and objectives regarding the environment and energy issues requires greater focus at a senior management level.

Keeping messages up to date and relevant is difficult with yearly changes in student population. Those institutions that have undertaken awareness campaigns with the student body have found it to be effective in the short term. The experience of institutions has often been that first-year students are keen on energy-saving, but in later years this interest wanes. A potential solution to these difficulties is to involve students more actively in the marketing of energy management. Some institutions identified incentives – often financial – for students to save energy while in residential accommodation, by offering rent rebates. Other institutions identified ways in which the student body was actually involved in initiating the awareness campaign, such as asking for new ideas, and poster appeals.

To promote the benefits to staff, one common approach adopted by institutions has been to illustrate the savings that can be made in employees' own homes. The hope is that this ethos would be extended to the workplace. For further examples see Appendix F – *Summary of ShareFair HE Energy Management Network Events* and Appendix I – *Case studies*.

3. Future issues

This section addresses issues that will have an increasing impact on the way that institutions operate in the future.

Legislation
Institutions have to respond to legislation covering workplace regulations (Health and Safety), and the revision of Building Regulations parts L1 and L2, April 2002. Looking ahead, the legislative agenda in the UK will be driven by the following UK legislative initiatives and European directives:

- Building Regulations: parts L1 and L2, April 2002
- EC Directive on the energy performance of buildings, to be implemented by January 2006
- Sustainable Energy Bill 2003
- White Paper *'Our energy future – creating a low carbon economy'* requiring 10 per cent reduction in carbon emissions by 2050.

Through such measures governments can help organisations to make economically efficient decisions which benefit both themselves and society at large. Possible measures in the higher education sector to respond to upcoming requirements could include:

- improved reporting and benchmarking of university energy consumption
- reform of university purchasing procedures
- promotion of energy service contracting
- market transformation programs for technologies, such as motors
- a series of measures within the construction industry, including the use of partnering and integrated design. See Appendix E, *Additional resources – publications and reports: 'Barriers to energy efficiency in the UK higher education sector'*.

Building regulations
The new Building Regulations Thermal Standards – Part L in England and Wales, Part J in Scotland – will include consideration of existing buildings.

Energy performance by building
A directive on energy performance of buildings was published in the EU's Official Journal in January 2003. The development sets the clock ticking for implementation of rules lauded as a key plank in the EU's strategy to combat climate change. See Directive 2002/91/EC of the European Parliament and of the European Council of 16 December 2002 on the energy performance of buildings (Official Journal L 001, 04/01/2003 P. 0065 – 0071), which is on the web at:
http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_001/l_00120030104en00650071.pdf

Under the law, EU member states must set up, by 4 January 2006, a scheme to certify the energy performance of all buildings and carry out regular inspections of boilers and air conditioning systems. By the same time, all building construction, sale and rental transactions will have to be accompanied by an energy performance certificate no more than ten years old, allowing potential occupants to compare building energy efficiency. For large public service buildings the certificate will have to be on public view. The certification requirement is expected to be the main driver of greater energy efficiency in buildings, but the directive also requires member states to lay down their own national minimum energy efficiency standards. No EU

minimum standard has been set. Religious buildings, temporary buildings, protected historic buildings and holiday homes are exempt (http://europa.eu.int/comm/energy/index_en.html).
The Expert Working Group recommends institutions to take action sooner rather than later, as to take action later will inevitably be more expensive in management time and implementation costs. Institutions have a choice between voluntary (proactive) measures or enforced compliance with legislation (reactive) actions.

Drivers for sustainability
In formulating environmental policies to address sustainability issues for energy, institutions need to be mindful of two drivers.

a. The need to help building owners and their building maintenance and construction teams reduce the impact associated with both constructing and operating buildings.

b. The need to address energy utilisation, both consumption and cost, in existing buildings.

The two documents below provide a broader consideration of these issues and other factors impacting on estates management for the further and higher education (FHE) sector:

- Drivers for sustainable estates management in the FHE sector (David Somervell, University of Edinburgh)
- External drivers for integrating sustainability into estates management in the higher education sector (Dr Ian Knight, Cardiff University).

Energy targets
The following targets have been identified so far for the private and public sectors.

Table 6 Energy targets for the private and public sectors

Market sector	Energy target	Comments
Industry (negotiated agreements)	Various agreements, most of which have set a reduction target for carbon emissions of approximately **15% between 2000 and 2010**. Interim targets and dates have been set within each agreement.	Umbrella agreements have been made between DEFRA and various trade bodies representing energy intensive business sectors for climate change agreements. The sector undertakes to meet a carbon saving target in return for an 80% discount from the Climate Change Levy.
Government estate	Carbon emissions for 2010 to be 10% less than those for 2000.	
Healthcare	Two sets of mandatory targets exist for NHS bodies in England (from March 2000 to March 2010): ▪ to reduce the level of primary energy consumption by **15% or 0.15 MtC**. ▪ to achieve **35-55 GJ/100 cu.m.** energy efficiency performance for all new capital developments; and that all existing facilities achieve **55-65 GJ/100 cu.m.**	Target set by John Denham, Minister of State for Health, in a letter dated April 2001 to chief executives and estates managers for all NHS trusts in England.

BEST COPY AVAILABLE

Market sector	Energy target	Comments
Schools	Carbon emissions to be reduced **by 10% of 2000 levels by 2010** (or 20% of 1990 levels by 2010).	This target is referred to in correspondence between the Minister for Environmental Affairs and the Parliamentary Under-Secretary of State for Education.
Universities and colleges (FHE)	At the time of this report, no specific savings targets have been set for HE institutions. DETR's publication, *Climate Change – The UK Programme*, estimates carbon emissions to be 1 MtC per annum for FHE, of which 0.1 MtC could be eliminated by 2010.	The correspondence referred to above *(Schools)* indicates that DfEE (now DfES) will encourage the HE and FE sectors to set measurable indicators, such as reductions in carbon emissions – UK Government White paper **'Our energy future – creating a low carbon economy'** – (February 2003).
Hotels and hospitality	A voluntary scheme exists, known as Hospitable Climates, with a target to reduce carbon emissions by **15% below 1999 levels by the end of 2010**.	Signatories to this scheme receive regular details of government information, advice and grants that are available to support energy efficiency.
Sport and leisure	**No specific savings targets**, but benchmarks are available for comparison.	Energy performance benchmarks have been tailored to match specific sports centre facilities.
Offices	**No specific savings targets**, but benchmarks are available for comparison.	Energy performance benchmarks are currently being developed as for sports centres.
Retail	**No specific savings targets**.	

Government bodies

The work of the following panels is also important:

- market transformation panels
- Sustainable Development Education Panel
- UK government: DTI and sustainable construction
- Sustainable Development Commission.

Together with increasing legislation, the above provide a clear indicator of government intention to correct failures in the market for energy management and to improve organisational decision-making. For further details see Appendix H, *External drivers for integrating sustainability into estates management in the HE sector.*

Sustainable Development Education Panel

In its third annual report (2001), the panel identified that:

'Sustainable development is now recognised as a mainstream issue for the further and higher education (FHE) sectors, and the response called for is not just one of damage limitation. These sectors have a major

BEST COPY AVAILABLE

role to play in building the capacity of their staff, students and local communities to participate fully and effectively in translating the rhetoric of sustainable development into reality. Their associated standard setting bodies also have an important influence on the curriculum.'

Energy service companies

In the private and commercial sectors, some companies are outsourcing non-core activities to enable them to focus on the main elements of their business. Facilities management, catering and the supply of energy – including the purchase, installation and maintenance of equipment to meet heat, light and power needs – are areas currently being contracted out. By employing an energy services company (ESCO) to manage the supply of energy a company can concentrate on its main activities.

Action Energy has produced free information on the subject of ESCOs. *'The efficient provision of energy through the use of energy service contracts'* (reference GIL67) provides an introduction to energy service contracts and highlights the types of contracts and funding arrangements available. In addition, it details case studies of organisations that have contracted out their energy services. Energy service contracts cover: supply of energy; purchase, design, installation, operation and maintenance of plant; and can include energy audits and energy efficiency advice.

There are many benefits to contracting out the energy services for an organisation. A key benefit is the transfer of the risk from the company to the energy services company. The main risk is financial. If new plant is required, the cost is borne by the energy services company; any loss that occurs as a result of a breakdown in the plant or unforeseen down-time can also be the responsibility of the energy services company.

The level of risk the energy services company takes on depends on the content of the contract. Also, performance measures can be written into the contract, which can improve energy efficiency within the organisation.

Contracts can include as many or as few elements of energy services provision as an institution requires; in addition they can last as many years as required.

Climate change levy

This levy was introduced with effect from April 2001. High energy users are encouraged to reduce costs. Current provisions provide the following exemptions for HE institutions:

a. Domestic energy use.

b. Energy consumption below specified thresholds.

c. Pure research (for non-applied, commercial activities).

d. Implementation of quality CHP schemes.

Future changes to the climate change levy cannot be predicted. However, if current exhortations are not acted on, energy taxation measures are likely to feature more prominently in the future and impact on institutions.

Accountability and assurance

A number of energy management practitioners feel that to facilitate further changes in the management of energy within HEIs, the statutory framework provided by legislation needs to be supported by requirements

of the funding bodies to request information covering energy and other issues. However, it must be recognised that this would add to the accountability burden currently borne by institutions.

The issue of data collection and benchmarking will be increasingly critical in the future. At present, the way data are collected across the sector makes comparison between buildings and institutions almost impossible. It is hoped that the outcome of the current HEEPI exercise, expected in late 2003, will provide guidance and benchmarks that institutions will adopt across the sector. Benchmarking is critical to understanding the absolute and relative performance of buildings, institutions and their management of energy. Without these data and sector-wide agreement about voluntary targets, either in terms of consumption or emissions, it seems inevitable that externally imposed targets will be introduced.

The above issues will impact in various ways, and institutions are encouraged to take action now. A key component of any legislation will be the introduction of benchmarks. Institutions are encouraged to set up a transparent process to show that they are taking action to meet these benchmarks.

Since a failure to respond effectively is likely to lead to further legislation – that may be monitored by agencies such as funding bodies – a risk management approach is suggested and a good practice checklist has been developed (see Appendix D2, checklist 2 – *Energy management risk prompt list*).

Appendix A
Background to the study

Introduction

Following wide consultation involving all UK higher education institutions during July 1994, energy management was flagged by the HE sector as one of a number of subject areas of management concern to institutions. Subsequently energy management was the subject of the first of a series of studies to be undertaken as part of the HEFCE's Value for Money (VfM) initiative.

The energy management value for money study was undertaken in 1996. Some institutions reviewed had been actively committed to energy management for a number of years prior to the start of the study; this was identified by their ongoing investment of resources in energy management. For other institutions, the study highlighted that significant benefits were to be gained from implementing a range of energy saving measures. The study stressed that if the management of energy was not seriously considered by these institutions there was a risk that it would remain largely a technical issue rather than a management concern.

Since the original study in 1996, further study surveys have been undertaken regarding energy management in the HE sector. Between 1998 and 2000, the European Commission funded a study titled 'Barriers to Energy Efficiency in the UK Higher Education Sector'. It identified a number of barriers within the HE sector and the key policy initiatives available to improve the position. In 1999-2000 and 2001-02, two other surveys were undertaken by the UK funding bodies to evaluate the success of the 1996 study. The findings of all three study surveys are outlined in 'Utilities management in the HE sector', section 1 of the main text.

Aim and objectives of the study

The aim of the study was to undertake a review of the actions implemented by HE institutions following the findings of the Energy Management Study (1996), and to provide an update of the management of energy in the HE sector to date.

To achieve the above aim, the following objectives were identified:

- To ascertain, if possible, the level of energy savings to date achieved by the sector, distinguishing between the savings:
  - derived from effective procurement arrangements and changes in the energy market, and
  - those achieved through the better management of energy and the implementation of energy saving measures and initiatives.

- To review and update as necessary (but taking account of information already provided by Estates Management Statistics and the work being undertaken as part of the Higher Education Environmental Performance Improvement (HEEPI) project 232, Good Management Practice Initiative), the energy benchmarks established for each designated activity area (DAA), and to consider extending such benchmarks to

other DAAs (the above would include considerations regarding consumption, cost, period of occupation, operation and conditioned and non-conditioned environmental factors). To enable HEIs to benchmark their own buildings.

- To provide examples of good practice concerning energy management arrangements in HE institutions, in the UK and elsewhere. To publicise expertise within the HE sector for a range of energy saving initiatives and schemes.

- To identify sources of information, funding for HEIs available from other government-agencies and initiatives through web based and workshop solutions.

- To consider the future implications of current and impending UK legislation and European directives impacting on the management of energy and the environment in the HE sector.

Outputs of the study

To provide documentation available on related HE sector organisations web sites, including HEFCE.

An electronic version of the original Energy Management study, undertaken in 1996, is available on the HEFCE web-site under 'Publications', reference M 5/96. There is also a management review guide, reference M 16/96.

Project groups

Membership of the working groups charged with reviewing the 1996 study is given at Appendix B.

Appendix B
Membership of working groups

UK Value for Money Steering Group

Professor David Wallace (Chair)	**Loughborough University**
Richard Aveling	University College Northampton
Professor Chris Carr	St Martin's College, Lancaster
John Lauwerys	University of Southampton
Rosalyn Marshall	Queen Margaret University College
Professor Peter Townsend	University of Wales Swansea
Peter West	University of Strathclyde

Project Management Committee

Richard Aveling (Chair)	**University College Northampton**
Frank Dabell	School of Oriental and African Studies
Tony Holloway	Brunel University
Annie Kent (retired September 2001)	Middlesex University
David Lewis	University of Essex
Vic Slater	UMIST
Andrew Thorne	BRE
Peter West (retired October 2002)	University of Strathclyde

Expert Working Group

Frank Dabell (Chair)	**School of Oriental and African Studies**
Diana Hampson (retired October 2002)	University of Manchester
Tony Holloway	Brunel University
Ian Knight	Cardiff University
Alison Rooney	Glasgow Caledonian University
Vic Slater (appointed October 2002)	UMIST
David Somervell	University of Edinburgh
David Thomas	Energy Consortium

Andrew Thorne	BRE
Bob Wilson	University of Glasgow

Further details on the energy management study and other studies under the Value for Money Initiative are available from:

Ian Gross	Head of Internal Audit and Projects, HEFCE, Bristol
Brian Baverstock	Deputy Director of Financial Appraisal & Monitoring, SHEFC, Edinburgh
Robert Rogers	Head of Audit, HEFCW, Cardiff
Gillian James	Secretary to the UK VfM Steering Group, HEFCE, Bristol

VfM project staff

Brian Campbell	Consultant – Leadership, Governance and Management Group
Gillian James	Projects Officer – Leadership, Governance and Management Group

Appendix C
Participating higher education institutions

Higher Education Funding Council for England

Anglia Polytechnic University
Aston University
University of Bath
University of Birmingham
Birkbeck College, London
Bournemouth University
University of Bradford
Bretton Hall
University of Brighton
University of Bristol
Buckinghamshire Chilterns University College
University of Cambridge
Canterbury Christ Church University College
University of Central England
University of Central Lancashire
University College Chichester
City University
College of Ripon & York St John
Coventry University
Cranfield University
Dartington College of Arts
University of Derby
University of Durham
University of East Anglia
Edge Hill College of Higher Education
University of Essex
Falmouth College of Arts
University of Gloucestershire
University of Greenwich
Harper Adams University College
University of Hertfordshire
University of Huddersfield
University of Hull
Imperial College
Institute of Cancer Research
Keele University
Kent Institute of Art & Design
King Alfred's College, Winchester
Kingston University
University of Leeds
Leeds Metropolitan University
University of Leicester

University of Liverpool
Liverpool John Moores University
London School of Economics and Political Science
University College, London
London Institute
University of London, Senate House
Loughborough University
University of Manchester
University of Manchester Institute of Science and Technology
Middlesex University
University of Newcastle
University College Northampton
University of North London
University of Northumbria at Newcastle
University of Nottingham
Nottingham Trent University
Open University
School of Oriental and African Studies
University of Oxford
School of Pharmacy
University of Plymouth
University of Portsmouth
Queen Mary and Westfield College
University of Reading
Roehampton Institute, London
Rose Bruford College
Royal Academy of Music
Royal College of Music
Royal Holloway, University of London
Royal Northern College of Music
St Martin's College
University of Salford
University of Sheffield
Sheffield Hallam University
University of Southampton
Southampton Institute
South Bank University
Staffordshire University
University of Sunderland
University of Surrey
Surrey Institute of Art & Design
University of Surrey, Roehampton
University of Sussex
University of Teesside
Thames Valley University
Trinity College of Music

University of Warwick
University of the West of England
University of Wolverhampton
Writtle College
Wye College, University of London
University of York

Scottish Higher Education Funding Council
University of Aberdeen
University of Abertay Dundee
University of Dundee
University of Edinburgh
Edinburgh College of Art
University of Glasgow
Glasgow Caledonian University
Napier University
University of Paisley
Robert Gordon University
Royal Scottish Academy of Music and Drama
University of St Andrews
University of Stirling
University of Strathclyde

Higher Education Funding Council for Wales
University of Glamorgan
North East Wales Institute
University of Wales – Aberystwyth
University of Wales – Bangor
Cardiff University
University of Wales – Lampeter
University of Wales – Swansea
University of Wales Institute – Cardiff
Trinity College
Welsh College of Music and Drama

Department for Employment and Learning, Northern Ireland
Queen's University Belfast
University of Ulster

Appendix D1
Communication matrix questionnaire 2001-02 and results

The questionnaire was used to gather data regarding the present arrangements for energy management in HE institutions. Institutions were asked to consider the ten prompts under each element and then to tick those that most closely represented their institution's arrangements.

The results for each element of the communication matrix questionnaire 2001-02 are given below. Institutions could tick more than one box. The detailed results cover strategic policy framework, management responsibilities, motivating and marketing and training arrangements. A summary of the results is given in section 1 of the main text, *Utilities management in the HE sector.*

It is suggested that institutions use the prompts listed below to assess the effectiveness of their energy management arrangements (see Appendix D2 checklist 3 – *Communication matrix questionnaire checklist*). Realistic targets should then be identified to monitor performance over the next three to five years in respect of the following objectives:

- complying with legislation
- alignment with good management practice
- achievement of value for money.

Strategic policy framework

Questionnaire

A1: Energy efficiency issues are recognised, but they are addressed in an ad hoc fashion.

A2: Energy efficiency guidance has been drafted, but only for use by departmental technical and energy management staff.

A3: Some written guidelines exist on energy management, but there is no formal and approved energy policy.

A4: An energy policy has been formulated by an energy manager or senior departmental manager, but it has not been formally adopted by the institution.

A5: Effective energy management arrangements, that also include water management, have been documented within an approved utilities policy.

A6: A formal utilities policy has been signed by the head of the institution, but it is not part of a wider environmental strategy.

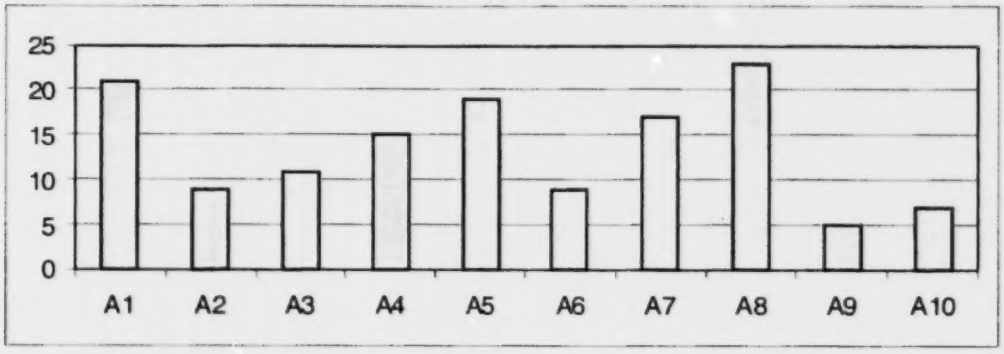
A7: Some consideration has been given to environmental issues, but no formal environmental policy or management system is in place.

A8: The utilities policy has been integrated within the institution's broader approach to implementing an environmental strategy.

A9: The utilities policy is embedded in an environmental strategy that includes SMART (Specific, Measurable, Achievable, Relevant, Timely) objectives, defined targets, and an agreed implementation programme and timetable.

A10: The environmental strategy and utilities policy are reviewed and updated at least every three years by a senior committee of the institution.

Results



Total number of replies = 56

Management responsibilities

Questionnaire

B1: Responsibility for energy costs and consumption is essentially a departmental administrative task.

B2: Promotion of energy efficiency is undertaken on ad hoc basis only by estates and departmental technical staff.

B3: Energy management is a part-time/shared responsibility for someone in the estates/facilities management department only.

B4: Estates department staff allocate some time, resources and expertise to preparing energy proposals, but there is no formal annual programme.

B5: Responsibility for energy/utilities management lies solely in the estates department and it is not widely shared or promoted within the institution.

B6: An energy manager has been appointed to task the procuring and monitoring of utilities consumption, and the promoting of energy efficiency.

B7: The energy manager reports to a standing committee that has 'energy users' representation.

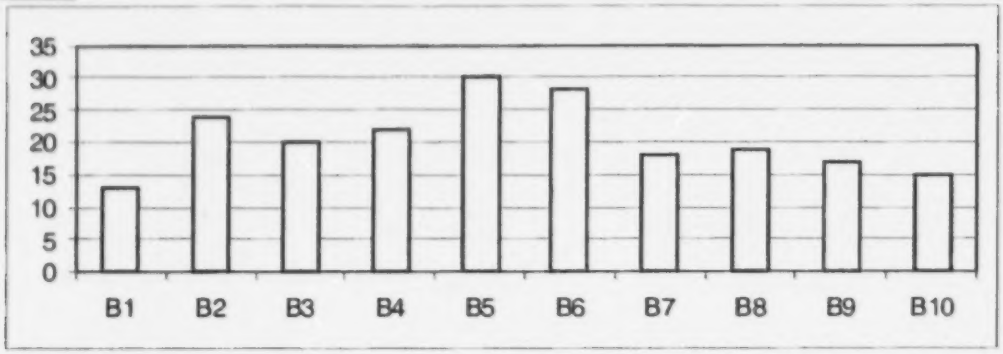
B8: The energy manager liaises with finance staff to present energy projects to the institution's main estates and/or senior management committee.

B9: The senior management team takes a proactive approach that fully supports the role of the energy management team within a sustainability strategy.

B10: Utilities monitoring, management and reporting are fully integrated into the senior management committee cycles, with positive feedback being given to the energy management team.

BEST COPY AVAILABLE

Results



Total number of replies = 56

Motivating and marketing

Questionnaire

C1: Contact with users limited to occasional exhortations to 'Save It'.

C2: Some promotion of energy issues, but nothing regular or targeted.

C3: Management information, reporting and guidance on energy efficiency opportunities circulated in ad hoc manner with no clear strategy or formal programme.

C4: Some ad hoc staff awareness training by estates staff, but not integrated into staff development programme.

C5: Contact with major users through ad hoc committee, chaired by senior departmental manager.

C6: Energy/environmental committee used as main channel for management reporting together with direct contact with major users.

C7: Regular programme of publicity for staff awareness – including induction.

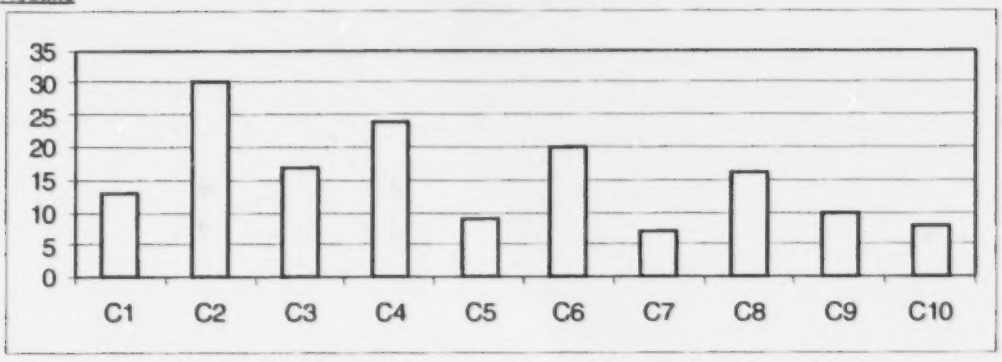
C8: Formal and informal channels of communication and management reporting regularly exploited by energy and environmental staff.

C9: Clear delegation of responsibility for utilities consumption with targets, monitoring and management reporting feedback to large users.

C10: The value of environmental protection and energy efficiency and the performance of utilities management are marketed within the institution and outside it.

BEST COPY AVAILABLE

Results



Total number of replies = 56

Training arrangements

Questionnaire

D1: Keeping up to date on energy efficiency is not an important consideration for estates and departmental technical staff.

D2: Trade journals and manufacturers' literature provide the main source of information for estates and departmental technical staff on energy efficient products and technologies.

D3: Professional and technical journals are scanned on an ad hoc basis for information on the latest developments in energy efficiency.

D4: Limited attempts are made to inform departmental technical staff of the techniques and benefits of energy efficiency.

D5: Limited training opportunities available for estates, departmental technical and energy management staff to develop and acquire appropriate skills in support of their energy management responsibilities.

D6: Trade journals, literature and other sources are studied for energy implications when replacing and purchasing new equipment for the institution.

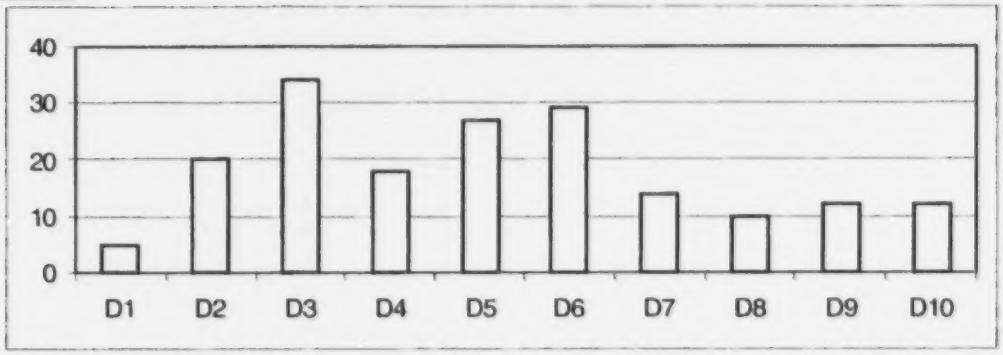
D7: Specific training provided for departmental technical and energy management staff to manipulate data and provide appropriate energy management information.

D8: Specific training provided for departmental technical and energy management staff to evaluate energy projects, using investment appraisal and whole life costing tools.

D9: The institution provides an active technical library, containing both web based and printed environmental and domestic/non-domestic energy efficiency materials.

D10: Continuous and comprehensive professional development is arranged for all estates, departmental technical and energy management staff within the institution.

Results



Total number of replies = 56

Appendix D2
Checklists and other resources

This appendix contains a range of tools and information to help HEIs develop their energy management policies. These are:

	Page
1 – Energy management good practice self-assessment checklist	43
2 – Energy management risk prompt list	53
3 – Communication matrix questionnaire checklist	58
4 – Business case template	62
5 – Appraising investment decisions checklist	66
6 – Repair or replace decisions checklist	69
7 – Energy savings measures schedule	72

1 Energy management good practice self-assessment checklist

This good practice checklist is based on existing energy and environmental good management practice, identified within a number of higher education institutions (HEIs). It has been produced as a guide for senior managers and others responsible for the management of energy, and internal auditors of HEIs. Other people may also find it useful, including members of governing committees, budget holders, professional advisers and external auditors.

The checklist is designed to promote good practice in managing energy, and could be of value in the following ways:

- to help senior managers, audit committees and governing bodies assess the effectiveness of their HEI's present energy management arrangements
- to help managers responsible for the operational arrangements for energy management within HEIs
- to help auditors (internal and external) and professional advisers in their reviews of HEIs' energy management arrangements
- to help HEIs maximise the benefits they achieve from the management of energy, for example, identifying energy saving measures; producing better, more credible information
- to support generally the quality and credibility of energy management arrangements in the HE sector.

How to use the checklist

The checklist is divided into sections, each with key questions on energy management arrangements. A Yes/No answer is requested, but space has been provided for comments on present arrangements and suggestions for areas for development or improvement. The checklist may also be used to identify priorities for implementing changes to the current management arrangements for energy.

Institutions may wish to use the checklist as follows:

- for **members of governing committees, senior management and energy management teams**, to conduct a quick review using only the key questions, or those from specific sections only
- for **internal auditors and/or other professional advisers** to 'walk through' the checklist with relevant institutional staff. This could be a full review of all the questions, or a more limited review of only key questions/specific sections
- for **energy management teams** to go through all the questions or, those from specific sections only.

Once the review is complete, a plan could be prepared detailing the action to be taken in response. This could be presented to the senior management team (or committee overseeing this area) for its consideration and/or approval. The senior management team could then receive periodic reports on progress towards achieving the action plan. The exercise could be repeated in short form at any time; but more thoroughly in line with the renewal of energy contracts, reviews of strategic policy arrangements for energy, and so on. It could be repeated annually or less often, say, every three years.

As indicated in Appendix H, *External drivers for integrating sustainability into estates management in the HE sector*, the future agenda for energy and environmental issues will increasingly be directed by legislation over the next five years. The actions identified in the following checklist will help institutions to develop a strategy that: addresses the legislative requirements that are being formalised now; helps promote a greater awareness of energy issues within the institution; and saves money.

The checklist covers:

- risk management – legislation, corporate social responsibilities etc (question 1)
- sustainability policy – strategic arrangements (questions 2 to 6)
- allocating responsibility for managing energy consumption (questions 7 to 12)
- communication with energy users (questions 13 to 17)
- supporting energy awareness by training users (questions 18 to 19)
- business planning (question 20)
- investment appraisal methods (questions 21 to 28)
- project funding (questions 29 to 39).
- procurement arrangements (questions 40 to 44)
- surveys, planning, audits and reviews (questions 45 to 52)
- management information and systems (questions 53 to 65)

The checklist should be adapted to meet the needs of the institution. Further information regarding the issues raised may be found in Appendix E, *Glossary, bibliography and additional sources*.

1 Energy management good practice self-assessment checklist

Recommended energy management actions		Key Action? – Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
Risk management – legislation, corporate social responsibilities etc				
1	Risk management processes in place for compliance with legislation, corporate social responsibilities and other issues relating to energy management (see Appendix D2, *Energy management risk prompt list*)			
Sustainability policy – strategic arrangements				
2	Strategic arrangements for energy apply to the management of all utilities – including water – as part of a sustainability policy (see section 2 of the main text *'Sustainability framework for the HE sector'*)			
3	Sustainability policy is updated in line with changes to the institution's corporate plan and corporate social responsibilities strategy			
4	Sustainability policy is supported by an energy plan for implementing and monitoring clearly defined annual objectives and performance measures			
5	Sustainability policy and energy plan clearly define corporate and individual responsibilities – for the institution, senior management team, staff and students			
6	Regular risk management reviews are undertaken in respect of the institution's utilities arrangements (see Appendix D2, *Communication matrix questionnaire checklist*, questions A1 to 10)			
Allocating responsibility for managing energy consumption				
7	Strategic responsibilities for energy and environmental issues have been			

47 BEST COPY AVAILABLE

Recommended energy management actions		Key Action? – Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
	identified			
8	There is senior management commitment to continuous improvement in the management of energy and related issues			
9	Operational responsibilities for energy management have been assessed (see Appendix D2, *Communication matrix questionnaire checklist*, questions B1 to 10)			
10	Energy user liaison representatives have been appointed throughout the institution			
11	Formal arrangements have been implemented for identifying energy targets, monitoring and management reporting, as part of allocating responsibilities at strategic and operational management levels			
12	The value of environmental protection, energy efficiency and the performance of utilities management are marketed within the institution and outside it			
Communication with energy users				
13	There is regular contact with all users concerning energy management			
14	The production and dissemination of management information, and the reporting and guidance on energy efficiency opportunities, is part of a formal energy communications programme			
15	The energy and environmental strategies of the institution are underpinned with a communications programme that involves all students and staff			
16	The effectiveness of marketing and awareness actions for different energy users are regularly assessed and updated as necessary (see Appendix D2,			

BEST COPY AVAILABLE

Recommended energy management actions		Key Action? – Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
	Communication matrix questionnaire checklist, questions C1 to 10)			
17	Free government publications and 'create your own' energy awareness materials are used as part of the energy communications programme for all students and staff			
Supporting energy awareness by training users				
18	Energy awareness training for students and staff is undertaken by estates staff, as part of integrated staff development programmes (see Appendix D2, *Communication matrix questionnaire checklist*, questions D1 to 10)			
19	Professional energy training is provided for all estates staff (and others) who have specific and defined roles regarding energy management			
Business planning for energy projects				
20	Business plans are prepared for all major energy projects and investments (see Appendix D2, *Business case template*)			
Investment appraisal methods				
21	Investment appraisal methods are used to evaluate energy efficiency projects (see Appendix D2, *Appraising investment decisions checklist*)			
22	Payback criteria are applied to all energy projects below £25,000 and/or where payback period/economic life is less than 5 years			
23	There is an annual budget for energy management projects			
24	Investment criteria have been identified for all energy projects and other capital projects between £25,000 and £100,000 and/or where payback			

BEST COPY AVAILABLE

Recommended energy management actions		Key Action? – Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
	period/economic life is between 5 to 10 years			
25	A comprehensive investment appraisal is undertaken for all energy projects and other capital projects over £100,000 and/or where payback period/economic life is over 10 years			
26	The investment appraisals of all new-build and refurbishment opportunities include utilities, maintenance and other running costs (see Appendix D2, *Repair or replace decisions checklist*)			
27	The institution takes full account of all benefits, including those which may not have an identifiable direct cost benefit			
28	The payback/investment criteria used for energy projects are regularly reviewed			
Project funding				
29	All no cost/low cost energy efficiency measures have been identified and implemented (see Appendix D2, *Energy savings measures schedule)*			
30	There are funding processes in place and resources available to increase energy efficiency savings			
31	Over the last 5 years, investment has been made by the institution to increase the energy efficiency/management of its premises			
32	The institution proposes to increase its investment in energy efficiency/management of its premises over the next 5 years			
33	Changes have been implemented in the past for funding energy projects			
34	The institution makes available funding from capital, revenue or borrowing for			

50 BEST COPY AVAILABLE

	Recommended energy management actions	Key Action? – Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
	low risk projects with paybacks of less than one year			
35	The institution formally considers funding energy projects from capital budgets, even if very short-term returns are not evident			
36	Energy projects compete for capital funding along with other business opportunities			
37	Energy projects do not have to meet more stringent requirements for return on investment than other projects			
38	The institution discriminates positively in favour of 'green' schemes			
39	Environmental projects compete equally with other core business opportunities for funding			
	<u>Procurement arrangements</u>			
40	Reviews have been undertaken of purchasing arrangements for all utilities			
41	Energy fuel types, supply and tariff arrangements, tender and contract terms/arrangements are regularly documented, monitored and re-assessed, as part of the institution's energy management review processes			
42	The institution's energy purchasing arrangements allow it to: ▪ respond to market conditions ▪ convert to alternative fuels when appropriate			
43	Arrangements are in place to facilitate liaison between energy, finance and purchasing staff, regarding the negotiation and monitoring of energy contracts			
44	The institution is an active and full member of a purchasing consortium for its utilities supplies			

BEST COPY AVAILABLE

Recommended energy management actions		Key Action? – Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
Surveys, planning, audits and reviews				
45	Energy walkabouts and utilities surveys are conducted by experienced staff/consultants on buildings and plant equipment, to identify energy measures likely to deliver the greatest savings			
46	The utilities' monitoring and analysis arrangements are used to identify possible areas for energy efficiency and savings			
47	Lists of identified high/low cost energy project opportunities are retained, to facilitate their implementation			
48	Utilities surveys are regularly undertaken and the survey findings are published. Key actions identified following the surveys are reported upon as part of the implementation of a management action plan			
49	Energy staff are required to identify and assess the most energy efficient option in all capital (new-build), refurbishment, minor works and major maintenance project proposals and plant replacement decisions, to mitigate potentially detrimental energy implications			
50	Energy staff seek to identify all projects where energy efficiency can be improved at a marginal cost			
51	Life-cycle costs are taken into account when approving energy efficiency options			
52	Life-cycle costs decisions are identified and approved for environmental projects			

52

BEST COPY AVAILABLE

	Recommended energy management actions	Key Action? – Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
	Management information and systems			
53	The institution has access to adequate management information (ie, correct format, easily available and assessed), to support energy saving proposals			
54	Performance achievements of utilities management (ie against identified targets/benchmarks) are reported effectively to users			
55	Information is retained to help demonstrate whether previous investment in energy efficiency has been worthwhile			
56	Information is available to develop a case for energy project funding			
57	Promising energy proposals are presented to senior management			
58	There is an annual report on energy for the senior management team and/or a senior committee. (The report would include published trend data on utilities' consumption and cost. The report would be one of a number of self-assessment actions for energy performance established by the institution)			
59	The institution has access to a comprehensive energy management information system (EMIS) to: ▪ set targets/benchmarks ▪ monitor consumption ▪ identify faults ▪ quantify savings ▪ provide budget tracking ▪ utilities reporting			

53

BEST COPY AVAILABLE

Recommended energy management actions		Key Action? – Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
60	The institution's management information system enables/provides identification of: • past energy savings • opportunities for energy project investment, to meet the institution's environmental requirements/criteria			
61	The EMIS captures all cost-reporting based on energy invoice details			
62	Monitoring and targeting (M&T) reports are based on supply meter data			
63	M&T reports are based on sub-metered supply data for individual premises/plant equipment, for major consumers and elsewhere if cost-effective			
64	The institution has considered accounting for energy consumption at user departmental levels			
65	Energy staff are involved in budget setting			

BEST COPY AVAILABLE

2 Energy management risk prompt list

This energy risk prompt list has been compiled from information provided by several institutions.

The risks in the prompt list are for guidance only: the list is not exhaustive and should not be used as a surrogate risk framework. The guidance on how each risk could be addressed is indicative only; each institution should carefully consider its own risk response and the most appropriate control processes and early warning mechanisms. The format used is also illustrative – institutions may wish to produce more detailed descriptions, assign responsibilities to specific individuals and so on. The illustrative use of certain specifics, such as posts and committees, does not imply any requirement that they should exist.

Further advice regarding other risks is available on the HEFCE web-site under Good practice/Risk management.

2 Energy management risk prompt list

Energy management				
Risk element		*Contributing factors*	*Mitigating actions*	*Early warning mechanisms*
Em1	Fail to determine and communicate an appropriate and focused sustainability strategy. Failure to set and achieve energy management performance targets and objectives reflected in corporate plans. Damage to reputation.	• Poor awareness of emerging issues, such as 'corporate social responsibility' • Forthcoming European 'energy related' directives • Government environmental policy changes • Ill-defined strategic objectives and planning arrangements • Lack of appropriate M&T system • Inability to interpret energy consumption/utilisation data	• Periodic reviews by a senior committee(s) [such as the audit committee; an environmental and energy (sustainability) committee]; including follow-up of actions identified • Strategic and operational monitoring and oversight by the senior management group • Implementation of sustainability policy • Professional advisory/update arrangements	• Not setting and the non-achievement of performance targets (eg, carbon emission reductions) • Internal/external comments or complaints • Possible qualifications in annual reports/financial statements • Collation of data for (and interrogation of) the Estates Management Statistics database
Em 2	Failure to comply with statutory requirements (UK legislation and European directives) leads to prosecution and/or closure of some buildings. Disruption to teaching and research facilities. Damage to reputation.	• Poor understanding/awareness of environmental and energy 'legislative drivers' • Inadequate metering and sub-metering arrangements (including non-retention/monitoring of readings) • Poor energy management and monitoring arrangements	• Implementation of good practice arrangements • Regular review of legislation requirements • Appointment of energy teams • Better communication between energy managers, and exchange of good practice as part of Energy ShareFair network	• Awareness of changing statutory requirements • Review of strategic planning arrangements • Failure to identify/obtain European and UK funding eg Community Energy projects

56 BEST COPY AVAILABLE

Energy management				
Risk element		*Contributing factors*	*Mitigating actions*	*Early warning mechanisms*
Em 3	Introduction of energy 'taxation' policies by Government. Punitive costs incurred, resulting in a reduction of available resource.	• Additional financial costs incurred • Failure to plan and identify mitigating actions • Poor understanding/awareness of legislation	• Implementation of energy saving measures • Setting of energy performance targets and benchmarking • Responding to legislation in a timely way, to avoid higher implementation costs	• Market intelligence obtained by membership of energy purchasing consortiums and Energy ShareFair networks • Press releases by government agencies • Increase in statutory inspections/visits
Em 4	Potential liabilities attached to energy contracts. Failure to effectively assess energy requirements forming part of energy contracts. Significant costs incurred not included in financial plans (budgets). Failure to check and monitor invoices and accounts from energy supplier. Reduction in available resources.	• Inadequate legal and procurement arrangements • Inadequate information about energy contracts • Inappropriate metering and sub-metering arrangements • Management information not provided/and or not on a timely basis • Failure of energy supplier to make agreed adjustments and corrections to energy invoices and accounts • Failure to set and monitor energy budgets	• Access to best management practice, advice and information through membership of energy purchasing consortiums and Energy ShareFair networks • Regular reviews of energy contracts – register of contracts; review of 'break' clauses in energy contracts • Review of energy invoicing, budgeting and accounting • Implementation of an appropriate M&T system (and acting on reports)	• Significant (unplanned/not provided for) costs incurred in energy contracts • Results of periodic purchasing reviews – for example, late invoicing by energy supplier; high proportion of estimated accounts (and their continued submission) from energy supplier • Review findings of management information/reporting arrangements

57 BEST COPY AVAILABLE

Energy management				
Risk element		*Contributing factors*	*Mitigating actions*	*Early warning mechanisms*
Em 5	Energy supplier under-performance. Disruption to energy supplies. Disruption to teaching and research facilities. Unable to operate.	• Business continuity arrangements not in place • Poor energy contract and project management arrangements • Inadequate management information • Failure to take references for energy supplier/contractor • Poor response by energy supplier to customer service queries and failure to act upon requests agreed with the institution	• Implementation of business continuity and risk management plans • Responsibility for contract/project management assigned to energy team • Regular reporting to management • Appropriate metering and sub-metering arrangements (including the retention and monitoring of readings)	• Articles in trade press • Adverse comments/reports from insurers • Failure of equipment • Complaints from staff/students • Late invoices from suppliers • High proportion of estimated accounts from supplier
Em 6	Under-investment in buildings, plant and equipment. Inability of the institution to function properly. Disruption to teaching and student accommodation.	• Lack of resources • Failure to allocate funds to support long term maintenance programmes	• Estates committee reviews • Regular building condition surveys • Implementation of planned and long-term maintenance programmes • Introduction of funding arrangements for energy projects (including the re-investment of energy savings) • Benchmarking of energy, maintenance and other occupation costs	• Annual reporting by energy teams • Complaints by students/staff • Deterioration and poor physical condition of buildings plant and equipment • Poor maintenance arrangements • Abnormal increases in energy consumption and cost

58 BEST COPY AVAILABLE

Energy management				
Risk element		*Contributing factors*	*Mitigating actions*	*Early warning mechanisms*
Em 7	Inadequate/lack of consideration of energy saving measures during the building design stages for new-build, refurbishment and major maintenance projects. Failure to identify, prioritise and fund appropriate energy saving measures. Loss of energy savings. Failure to meet legislative requirements. Failure to provide services to students.	• Inadequate metering and sub-metering arrangements • Non-adoption of life cycle costing arrangements for energy management arrangements • Failure to develop business case proposals for energy projects • Lack of awareness of legislation – current and forthcoming future requirements • Adopting a reactive approach rather than proactive approach to energy issues • Extensive retro-fitting of energy saving measures	• Preparation of business case for energy projects • Post-implementation reviews of energy projects • Timely reports to senior management team • Follow-up of regular energy walkabouts/utilities surveys • Implementation of an appropriate M&T system (and acting on reports) • Successful in obtaining European/UK funding for environmental and energy projects	• Inadequate energy budget – reduction • Expensive proposals for retro-fitting of energy saving measures • Significant growth in costs linked to energy contracts • Complaints by students or staff • Unregulated growth in energy consumption/utilisation

59

BEST COPY AVAILABLE

3 Communication matrix questionnaire checklist

Recommended energy management actions	Part of present energy arrange ments? Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
Strategic policy framework:			
A1: Energy efficiency issues are recognised, but they are addressed in an ad hoc fashion. A2: Energy efficiency guidance has been drafted, but only for use by departmental technical and energy management staff. A3: Some written guidelines exist on energy management, but there is no formal and approved energy policy. A4: An energy policy has been formulated by an energy manager or senior departmental manager, but it has not been formally adopted by the institution. A5: Effective energy management arrangements, that also include water management, have been documented within an approved utilities policy. A6: A formal utilities policy has been signed by the head of the institution, but it is not part of a wider environmental strategy. A7: Some consideration has been given to environmental issues, but no formal environmental policy or management system is in place. A8: The utilities policy has been integrated within the institution's broader approach to implementing an environmental strategy. A9: The utilities policy is embedded in an environmental strategy that includes SMART (Specific, Measurable, Achievable, Relevant, Timely) objectives, defined targets, and an agreed implementation programme and timetable			

60 BEST COPY AVAILABLE

Recommended energy management actions	Part of present energy arrangements? Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
Management responsibilities:			
B1: Responsibility for energy costs and consumption is essentially a departmental administrative task. B2: Promotion of energy efficiency is undertaken on ad hoc basis only by estates and departmental technical staff. B3: Energy management is a part-time/shared responsibility for someone in the estates/facilities management department only. B4: Estates department staff allocate some time, resources and expertise to preparing energy proposals, but there is no formal annual programme. B5: Responsibility for energy/utilities management lies solely in the estates department and it is not widely shared or promoted within the institution. B6: An energy manager has been appointed to task the procuring and monitoring of utilities consumption, and the promoting of energy efficiency. B7: The energy manager reports to a standing committee that has 'energy users' representation. B8: The energy manager liaises with finance staff to present energy projects to the institution's main estates and/or senior management committee. B9: The senior management team takes a proactive approach that fully supports the role of the energy management team within a sustainability strategy. B10: Utilities monitoring, management and reporting are fully integrated into the senior management committee cycles, with positive feedback being given to the energy management team.			

61 BEST COPY AVAILABLE

Recommended energy management actions	Part of present energy arrangements? Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
Motivating and marketing:			
C1: Contact with users limited to occasional exhortations to 'Save It'. C2: Some promotion of energy issues, but nothing regular or targeted. C3: Management information, reporting and guidance on energy efficiency opportunities circulated in ad hoc manner with no clear strategy or formal programme. C4: Some ad hoc staff awareness training by estates staff, but not integrated into staff development programme. C5: Contact with major users through ad hoc committee, chaired by senior departmental manager. C6: Energy/environmental committee used as main channel for management reporting together with direct contact with major users. C7: Regular programme of publicity for staff awareness – including induction. C8: Formal and informal channels of communication and management reporting regularly exploited by energy and environmental staff. C9: Clear delegation of responsibility for utilities consumption with targets, monitoring and management reporting feedback to large users. C10: The value of environmental protection and energy efficiency and the performance of utilities management are marketed within the institution and outside it.			
Training arrangements:			
D1: Keeping up to date on energy efficiency is not an important consideration for			

62 BEST COPY AVAILABLE

Recommended energy management actions	Part of present energy arrangements? Yes/No	Suggestions for improvement as part of the present energy management arrangements?	Comments/priorities for implementation
estates and departmental technical staff. D2: Trade journals and manufacturers' literature provide the main source of information for estates and departmental technical staff on energy efficient products and technologies. D3: Professional and technical journals are scanned on an ad hoc basis for information on the latest developments in energy efficiency. D4: Limited attempts are made to inform departmental technical staff of the techniques and benefits of energy efficiency. D5: Limited training opportunities available for estates, departmental technical and energy management staff to develop and acquire appropriate skills in support of their energy management responsibilities. D6: Trade journals, literature and other sources are studied for energy implications when replacing and purchasing new equipment for the institution. D7: Specific training provided for departmental technical and energy management staff to manipulate data and provide appropriate energy management information. D8: Specific training provided for departmental technical and energy management staff to evaluate energy projects, using investment appraisal and whole life costing tools. D9: The institution provides an active technical library, containing both web based and printed environmental and domestic/non-domestic energy efficiency materials. D10: Continuous and comprehensive professional development is arranged for all estates, departmental technical and energy management staff within the institution.			

BEST COPY AVAILABLE

4 Business case template

Institutions may find the following template helpful in setting out the economic costs and benefits (tangible and intangible) for energy related projects. The template should be regarded as complementary to the institution's own investment appraisal procedures and should therefore be adapted as necessary.

Preparing a business case

The following are the key elements that would normally be found within a business case.

a. Executive summary This should summarise the key points of the proposal and should include explicitly the resources that are being requested and the benefits that will accrue.
b. Description of the project/investment This would comprise a short but precise description of the project. It should summarise for management why the proposal is being brought forward (draw particular attention here to any compliance/health and safety issues, if relevant, and to linkages with the strategic priorities, institutional drivers), the nature of the investment/project (ie what is being purchased/requested), what it will do and the benefits it will bring, and where it will impact within the institution. This last point is important in allowing senior management to judge the spread of benefits.

c. *Current position*

In this section, the proposer should give any relevant background knowledge that the readers will require, plus a brief description of what happens currently. On reading this section, it is important that senior management is able to judge whether what is proposed is a replacement/part-replacement or new investment altogether. If it is a proposal for a replacement and it is essential, then make this clear – for example, in the case of a capital replacement proposal, by indicating the current state of the existing equipment.

d. Options appraisal

In this section of the business case, detail the alternative options that have been considered, including that of doing nothing. The primary purpose of the options appraisal phase is to select a solution which optimises value for money within the overall constraints of affordability and achievability. Here it is important to highlight the additional benefits that each option might bring – it is suggested that these need to be considered across the whole lifetime of the project. Any assumptions made about the external operating environment should be included here.

For each option, list any assumptions made, benefits analysis, financial analysis, sensitivity analysis and risk analysis. From these, it should be possible to do an economic analysis ie compare costs with anticipated benefits and so derive value-for-money comparisons.

The financial analysis needs to take account of the total outlays for the project. These may include, for example, one-off capital outlays, revenue costs and professional fees for advisers. On the positive side, the proposer needs to identify the financial benefits that will flow. These may come in different forms, for example, as savings that will accrue from making the investment (for example, CHP), ongoing current actual revenue savings, sale of existing assets. It is also important to include the residual value of new assets at the end of the investment appraisal period. As expenditure and savings may occur throughout the time period of the investment proposal, adjustment will have to be made for the relative cost of money into the future – this is done by discounting net future cash flows back to the present day. Finance staff in institutions will be able to advise should energy managers require assistance.

The sensitivity analysis is critical and may relate to all aspects of the proposal, for example, costs, returns, capital machinery performance and savings. Essentially, what the sensitivity analysis does is to get the proposer thinking about the range in which costs and returns might lie. For example, anticipated energy savings may vary by plus or minus 10 per cent, and either could have a bearing on the attractiveness of an investment option for senior management. For both benefits and risks, it is important to consider both quantifiable and non-quantifiable aspects – for the non-quantifiable aspects, some scoring mechanism is needed to assess relativity between the options, for example, high, medium, low.

Finally, taking account of the options analysis, a preferred option is proposed.

In evaluating the benefits associated with energy management projects, it is suggested that whole life costing (or life cycle cost analysis) is the most appropriate and effective tool to use.

e. Monitoring and evaluation

Once a preferred option has been identified, it is usual to indicate how the overall project will be monitored and evaluated. Within this, the proposer may wish to consider ways of monitoring expenditure and savings, and how the overall effectiveness of the project will be measured. Although monitoring of expenditure in the period of getting the project up and running may be fairly easy to identify, less easy may be monitoring ongoing net savings that may accrue from the investment. This is because other factors may impinge on savings, such as efficiency ratings of ageing plant and equipment; therefore some measure needs to be determined to take these into account.

5 Appraising investment decisions checklist

Important sub tasks would be proposed under each of the headings below. Further guidance may be found in Appendix D2, *Business case template* and in the Bibliography – *'Appraising investment decisions' (HEFCE 99/21)* and *'Investment decision making: a guide to good practice' (HEFCE 2003/17).*

		Key Task? – Yes/No	Part of present energy management arrangements? – Yes/No	Further actions identified
	Specify the objectives • How does this appraisal relate to the strategic aims of the institution? • Is the problem clearly defined? • Are the objectives supported by adequate background information, such as a strategic plan?			
	Identify the options • Has a sufficiently wide range of options been considered? • Has the 'do nothing' or 'do minimum' option been explicitly considered? • Have all realistic procurement options been appraised (including PFI and other innovative forms of procurement)			
	Value the costs, benefits, timing, risks and uncertainties • Has account been taken of all the direct costs and benefits accruing to the institution? • Are there any wider considerations? • Have all relevant costs, income streams and benefits (over the life of the project) been included?			

63 BEST COPY AVAILABLE

		Key Task? – Yes/No	Part of present energy management arrangements? – Yes/No	Further actions identified
	• Has allowance been made for running costs over the life of the project? • Have maintenance costs over the life of the project been taken into account? • Does the appraisal take account of assets that are already owned (opportunity costs)? • Does the valuation of the property represent the opportunity cost? • Is there any double-counting of costs and benefits? • What allowance has been made for non-financial aspects? • Have uncertainties in key assumptions been identified and tested? • Have risks been assessed and valued?			
	Analyse the results • Has the net present value been calculated for each option? • Are the price base and the base date for discounting explicitly defined? • Has an appropriate discount rate been used? • Are all costs expressed in real terms? • Is there a relative price effect to take into account?			
	Assess affordability • Has the impact on the institution's overall financial position been assessed? • Can the institution accept the best and worst case scenarios? • Does the preferred solution require HEFCE approval?			

69 BEST COPY AVAILABLE

		Key Task? – Yes/No	Part of present energy management arrangements? – Yes/No	Further actions identified
	Presentation of results • How does the chosen option compare with the alternatives? • Are the results set out clearly, in an appraisal report, in a logical order and with all relevant assumptions made clear? • Are tables available showing the details of costs and benefits for all options? • Do they show the effects of risks? • Do they show the influence of sensitivities? • Is the overall financial impact clear?			
	Monitoring and evaluation • Is provision made for monitoring project performance? • Are proposals included in the appraisal report for evaluating the project and its performance once implemented? • Is the timescale for evaluation defined?			

BEST COPY AVAILABLE

6 Repair or replace decisions checklist

This checklist is designed to help institutions decide whether to repair or replace building fabric, installed equipment, and service elements and components. The checklist should be modified to meet the specific requirements of the institution.

Considerations	Options	Repair (Tick box	Replace only **one** per section)
Age: Consider the age of the element/component in relation to its expected economic life.			
Age is less than expected economic life	Consider repair, if condition is very satisfactory [*or replace reference to condition with 'repair before replacement'*].		
Age is at or close to expected economic life	Consider repair and/or partial replacement, if condition is satisfactory in part.		
Age is more than expected economic life	Consider replacement, if condition is very unsatisfactory.		
Condition: Assess the current condition, as well as any underlying trend in condition, of the element/component in relation to its operating performance.			
Current overall condition, and the underlying condition trend, is very satisfactory and consistent	Continue to repair as necessary. Priority is low.		
Current condition, and the underlying condition trend, is satisfactory in part and therefore subject to qualification (which should be stated, either in regard to the element's/ component's condition and/or its rate of deterioration)	Consider repair and/or partial replacement. Priority is medium to high. Repair as generally required, but consider replacing worst parts and, if appropriate, start to plan for replacement in part, or complete. If the rate of deterioration indicates, then appraise condition more frequently. If repair is not cost-effective, then replace.		
Current overall condition, and the underlying condition trend, is very unsatisfactory (giving cause for concern that the trend in the rate of deterioration is rapid and/or hazardous and/or liable to contravene legislation)	Replace as a high priority.		

BEST COPY AVAILABLE

Considerations	Options	Repair (Tick box)	Replace (only **one** per section)
Maintenance costs: Ascertain the current level of maintenance expenditure on the element/component as a proportion of its capital cost, and whether life-cycle costs indicate that replacement provides clear cost-benefits.			
Maintenance costs are low	Continue to repair.		
Maintenance costs are average	Consider repair and/or partial replacement. Repair as generally required, but consider replacing worst parts and, if appropriate, start to plan for replacement in part, or complete. If the rate of deterioration indicates, then appraise condition more frequently. If repair is not cost-effective, then replace.		
Maintenance costs are high	Replace, if life-cycle costing indicates positive cost-benefits.		
Energy cost-benefits: Identify the current level of energy consumption cost of the element/component as a proportion of its operating costs, and whether energy cost-savings indicate that overall replacement is cost-effective.			
Energy cost-benefits are high	Replace, if positive cost-benefits indicated.		
Energy cost-benefits are average	Consider repair and/or partial replacement, as appropriate.		
Energy cost-benefits are low	Continue to repair.		
Technology and design opportunities: Evaluate the continued 'fitness for purpose' of the element/component and whether developments in technology and design indicate that overall replacement provides clear cost-benefits.			
Fitness for purpose is very satisfactory	Continue to repair.		
Fitness for purpose is satisfactory	Consider repair and/or partial replacement, as appropriate.		
Fitness for purpose is unsatisfactory	Replace.		
Spare parts availability and cost: Confirm that spare parts for the element/component are readily available at a reasonable cost.			
Spare parts are readily available at a reasonable cost	Consider repair, if other factors indicate cost-benefits.		
Spare parts are not readily available at a reasonable cost	Replace, even if other factors indicate otherwise. Circumstances would indicate that advances in technology, etc, have taken place.		

Other comments:

BEST COPY AVAILABLE

Summary

Considerations	**Findings** (Indicate findings, whether repair or replace, for each of the completed sections above)	**Risk** (on a scale of 1 – 5, where 5 is greatest)	**Priority** (on a scale of 1 – 9, where 9 is highest)	**Final decision**
Age				
Condition				
Maintenance costs				
Energy costs				
Technology and design				
Spare parts				

Actions

Supplier	
Purchase Order No	
Date	

Signed:.....

Date:.....

Notes

7 Energy savings measures schedule

The following measures, classified by payback period, are some suggested items that could be part of an energy savings strategy.

Payback period	Boiler room, heating system and other measures	
Free measures	• Eliminate unnecessary running of boilers at weekends • Eliminate holiday heating • Ensure that controls are set to provide the temperatures you want at the times you need, and that the temperatures comply with current statutory requirements	• Reduce domestic hot water temperatures* • Isolate immersion water heaters during holidays • Use swimming pool cover where fitted • Replace 38mm fluorescent tubes with high efficiency 26mm tubes as the former expire (if you have switch start fittings)
Short payback (less than 2 years)	• Recommission optimiser and heating controls • Check that boiler air/fuel ratio is correct (as part of regular maintenance) • Fit boiler sequence controls • Repair leaks on distribution mains • Reduce use of supplementary electric heaters • Install, repair or replace thermostats • Insulate domestic hot water cylinder • Provide additional heating controls for individual heaters	• Reset domestic hot water thermostat* and time switches and make tamperproof • Blank off unused air grilles behind radiators • Seal unused chimneys and ventilation stacks • Fit reflective foil behind radiators • Install time-switches for swimming pool circulating pumps • Replace tungsten lighting with compact fluorescent lamps
Medium payback (2 – 5 years)	• Install modern instruments to control boiler burners and measure flue gas composition • Discontinue night set-back and install optimiser • Install thermostatic boiler controls • Improve/repair thermal insulation on the boiler • Fit an optimiser and/or compensator • Install a Building Energy Management System • Install dual fuel burners to boiler • Insulate pipework to heating system • Fit timeclocks to hot water immersion heaters • Replace central hot water boiler with point-of-use gas or off-peak electric heaters • Fit thermostatic radiator valves • Replace on-peak electric convector heaters with off-peak storage	• Fit timeclocks to fan convector heaters • Improve controls to storage radiators • Install manual swimming pool cover • Fit self-closing devices to external doors • Draught-strip external doors and windows • Insulate loft spaces to current standards • Install cavity wall insulation • Install spray taps (soft water areas only) and automatic valves to showers • Install water economy equipment to WC and urinal cisterns • Install heat pump heat recovery system to swimming pool • Control run times for extract fans • Rearrange switching of light fittings

BEST COPY AVAILABLE

Payback period	Boiler room, heating system and other measures	
Long payback (typically 5 – 10 years)	▪ Improve zoning of the heating system ▪ Install new condensing boiler ▪ Replace electric storage and water heaters with gas-fired heaters ▪ Install draught lobby to main entrance ▪ Install double glazing ▪ Fit secondary double glazing ▪ Install occupancy sensors to control lighting	▪ Replace old fluorescent fittings with modern efficient fittings , e.g. high frequency fluorescent fittings ▪ Insulate existing swimming pool roof and walls ▪ Install automatic swimming pool cover ▪ Replace excessive areas of glazing with insulated infill panels

* Statutory compliance

The following measures, classified by services function, are some suggested items that could be part of an energy savings strategy of the institution as part of its management arrangements.

Electrical plant

- Better use of tariffs – day/night rates etc
- Power factor correction
- Plant scheduling and maximum demand control
- Motor size reduction
- Motor speed reduction
- High efficiency electric motors
- Variable speed drives for electric motors
- Application of flat belts for electric drives
- Transformer selection and sizing
- Efficient utilisation of lift equipment and operational controls
- Mains-borne signalling to control lighting, M&E plant and so on

Lighting systems

- More efficient lighting systems – slim fluorescent tubes, compact fluorescent units and so on
- Lighting control to include photocell, acoustic, movement, time, pull cords and so on
- High frequency lighting
- Microprocessor based lighting control systems
- Lighting switching arrangements – configure with room layout and so on
- Appropriate lighting levels – not excessive
- Cleanliness of luminaires
- Reflector and silvered type light fittings

Boilerplant

- Improvement to combustion efficiencies
- Use of condensing boilers
- Installation of economisers, waste heat recovery units and so on
- Improvement to boiler plant management and operating procedures
- De-centralisation of boilers
- Use of high efficiency boilers
- Reduction in boiler operating pressure
- Reduction in standing heat losses from boilers
- Installation of new and improved controls – optimised start and stop, compensated circuits and so on
- Installation of sequence boiler firing controls

BEST COPY AVAILABLE

- Installation of flue baffles
- Boiler replacement
- Installation of summer boiler
- Fuel conversion changes and alternative fuel strategy
- Full automation, ie, oxygen trim controls
- Re-commissioning of controls
- Pipework and fittings insulation

Fuel storage and handling systems

- Oil tank insulation
- Oil temperature controls improvements

On site power production

- Combined heat and power
- Peak demand reduction ('lopping') using stand-by power generation

Distribution systems

- Distribution pipework and fittings insulation
- Removal of redundant pipework
- Steam trap operation
- Improvements to condensate recovery
- Insulation of pipework fittings and valves, and so on
- Reduction in energy losses by repairing leaking distribution pipework
- Destratification systems
- Re-commissioning of controls

Space heating systems

- Improvements to existing space heating controls
- Removal of 'on peak' supplementary (secondary) electric heating
- Improvements to zoning of space heating
- Replacement of existing space heating systems with more efficient alternatives, such as radiant heating systems
- Introduction of improved space heating controls
- Use of an energy management system
- Use of a building management system
- Installation of thermostatic radiator valves
- Fitting of reflective foil behind radiators
- Re-commissioning of controls

Domestic hot water systems (DHW)

- Improvements to existing DHW controls
- Introduction of improved DHW controls
- Changing centralised DHW generation to local electric/gas heating systems
- Use of tap restrictors
- Installation of showers rather than baths
- Re-commissioning of controls

Air conditioning and mechanical ventilation

- Heat recovery for space heating, pre-heating of DHW
- Improvements to existing heating, ventilating, and air conditioning (HVAC) controls
- Introduction of improved HVAC controls
- Better use of speed control for ventilation plant
- Investigation of speed control for ventilation plant
- Free cooling
- Sequence control of cooling tower fans and condenser pumps
- Night time purge
- Air quality control – to vary air ventilation rates
- Alternative cooling systems in line with Building Regulations revision L
- Re-commissioning of controls

Building fabric

- Reduction in air infiltration rates
- Improvements to building insulation
- Installation of secondary glazing
- Improvement to draught stripping
- Better utilisation of space
- Installation of fast acting doors
- Installation of air curtains

Catering

- Replacement of existing equipment
- Improvements to management (use by staff) techniques – avoiding excessive pre-heating of catering equipment, operation of freezers/fridges and so on

Swimming pools

- Use a pool cover
- Investigate combined heat and power
- Investigate heat pumps
- Investigate use of condensing boilers
- Effective space and pool water temperature control

Incineration

- Heat recovery
- Fuel change
- Plant replacement

Compressed air

- Leakage in compressed air systems
- Control of air compressors
- Centralisation or de-centralisation of compressed air plant
- Replacement of compressor plant
- Heat recovery

Water systems

- Reduction in leakage rates
- Recycling of water
- Installation of water conservation devices
- Better use of water tariff
- Reduce water outlet temperature in-line with HS(G) 70, if appropriate

Chiller/cold store plant

- Space utilisation
- Heat recovery
- Sequence and load control
- Temperature control
- Insulation

Utility management

- Installation of Building Energy Management Systems
- Initiation of formal M&T programme
- Energy awareness programme and good housekeeping programmes
- Energy-conscious design incorporated into new-build and refurbishment projects
- Energy efficiency improvement tasks included in planned maintenance contracts
- Electricity purchasing review
- Natural gas purchasing review
- Water tariff alterations, ie, non-return to sewer allowance
- Cold water saving devices including tap restrictors, WC cistern dams, urinal flush controllers

Appendix E
Glossary, bibliography and additional sources

Glossary

Action Energy – the Action Energy programme (formerly the energy efficiency best practice programme EEBPp) is a UK government programme designed to help organisations cut their energy bills by 10-20 per cent. It provides independent, authoritative advice and assistance to UK private and public sector organisations

AUDE – Association of University Directors of Estates

AUE – Association of University Engineers

BEMS – Building energy management systems , computerised control of a buildings energy use, such as heating, lighting and air conditioning etc

BETA – British Energy Trading Arrangements

BMS – Building management systems, computerised control of a building's systems such as energy, lifts, fire alarms, security etc

BRECSU – Building research energy conservation support unit – now part of Action Energy

BREEAM – Building research establishment environmental assessment method, launched in 1990 as a means of reviewing and improving the environmental performance of buildings linked to best practice in environmental design and management

Carbon Trust – The Carbon Trust was established in 2001 by the Government and works with the business community and the public sector on a range of initiatives supporting the implementation and commercial development of low carbon technologies

CCL – Climate change levy, a Government levy on carbon based fuels to encourage energy efficiency

CHP – Combined heat and power, the generation of electricity on site, combined with the use of the waste heat from the generation process

Community Energy – this programme offers funding, information and support to local authorities, Registered Social Landlords, universities, hospitals and other public service organisations for the refurbishment of existing and installation of new community heating schemes. Community Energy is jointly managed by the Energy Saving Trust and the Carbon Trust. It applies to England, Wales, Scotland and Northern Ireland

DHW – Domestic hot water

EMIS – Energy management information systems – see EMS

EMS – Estates Management Statistics

Energy Saving Trust – The Energy Saving Trust was established in 1992 by the Government, to encourage the sustainable and efficient use of energy by households and small organisations

ESCO – Energy services company

ETSU – Energy technology support unit – **now part of Action Energy**

EWG – Expert working group

FHE – Further and higher education

FM – Facilities management

GMP – Good management practice

GIA – Gross internal area

HVAC – Heating, Ventilation and Air-conditioning

HE – Higher education

HEFCE – Higher Education Funding Council for England

HEIs – Higher education institutions

HEEPI – Higher education environmental performance improvement

IT – Information technology

JPPSG – Joint Procurement Policy and Strategy Group

Life Cycle Costing Analysis – (LCCA) is an economic method of project evaluation in which all costs arising from owning, operating, maintaining and ultimately disposing of a project are considered to be potentially important to that decision. LCCA is particularly suitable for the evaluation of building design alternatives that satisfy a required level of building performance (including occupant comfort, safety, adherence to building codes and engineering standards, system reliability, and even aesthetic considerations), but that may have different initial investment costs, different operating, maintenance and repair (OM&R) costs (including energy and water usage), and possibly different lives. When energy conservation projects increase the initial capital cost of a new building or incur retrofit costs in an existing building, LCCA can determine whether or not these projects are economically justified from the investor's viewpoint, based on reduced energy costs and other cost

implications over the project life or the investor's time horizon (see 'Additional sources, international' – Life Cycle Costing Manual – Handbook 135, National Institute of Standards and Technology, USA)

M&T – Monitoring and targeting

NETA – New Energy Trading Arrangements

p/kWh – pence per kilowatt hour

PC – Personal computer

PMC – Project management committee

Renewable energy – is energy that comes from sources that essentially inexhaustible, such as the sun, the wind, moving water and the heat of the earth, or from replaceable fuels such as plants

SLA – Service level agreement

SLS – Service level statement/standards

SMART – Specific, measurable, achievable, relevant, timely

Therm – an Imperial unit of energy (29.31 kWh)

Utilities – includes all forms of energy and water related services

VfM – Value for money

Bibliography

'Appraising investment decisions' (HEFCE 99/21)
'Estates management statistics – annual report 2002' (HEFCE, December 2002/53)
'Facilities management – improving the management of support services in higher education' (National Report, HEFCE 00/14)
'Guidance on the procurement of services' (Joint Procurement Policy and Strategy Group (Volumes 1 and 2, September 2000)
'Investment decision making: a guide to good practice' (HEFCE, April 2003/17)
'Procurement in the English higher education sector: a good practice guide' (National Audit Office, May 1999)
'Procurement benchmarking for higher education' (Joint Procurement Policy and Strategy Group, September 1997)
'Procurement strategy for higher education' (Joint Procurement Policy and Strategy Group, September 1996)
'Rewarding and developing staff in higher education: a guide to good practice in setting HR strategies' (HEFCE March 02/14)

'Risk management – a briefing for governors and senior managers' (HEFCE 01/24) and 'Risk management – a guide to good practice for higher education institutions' (HEFCE 01/28)
'Strategic planning in higher education – a guide for heads of institutions, senior managers and members of governing bodies' (HEFCE 00/24)
'Sustainable Construction Procurement: A Guide to delivering environmentally responsible projects' (Addiss and Talbot, Construction Industry Research and Information Association (CIRIA), December 2001)
'Whole life costing: a good practice guide' (Joint Procurement Policy and Strategy Group, August 1998)

Additional sources

Best practice:
Action Energy
www.actionenergy.org.uk/ActionEnergy/default.htm

Carbon Trust
www.thecarbontrust.co.uk/thecarbontrust/default.htm

Energy Efficiency Best Practice Programme
www.energy-efficiency.gov.uk

FHE Action Energy
www.bham.ac.uk/energy-consortium/fhe/

Making a Corporate Commitment
www.macc2.org.uk/

Construction:
Construction Industry Research and Information Association (CIRIA)
www.ciria.org.uk

Technologies:
Climate Change Programme
www.defra.gov.uk/environment/climatechange/index.htm

Combined Heat and Power Association
www.chpa.org.uk/

Combined Heat and Power Club
www.chpclub.com/

CHP Heat Maps
www.est.org.uk/communityenergy/heatmaps.cfm

Manager's guide to CHP systems
www.chpclub.com/

Market transformation programme
www.mtprog.com/

HE sector organisations:
Association of University Directors of Estates
www.heestates.ac.uk/Partners/AUDE/

Association of University Engineers
www.aue.org.uk

Environmental Association for Universities and Colleges
www.eauc.org.uk

Environmental:
Forum for the Future
www.forumforthefuture.org.uk/

Higher Education Environmental Performance Improvement
www.heepi.org.uk/

Higher Education Partnership for Sustainability
www.forumforthefuture.org.uk/aboutus/default.asp?pageid=361 and www.heps.org.uk/

Funding:
Community Energy Programme
www.est.org.uk/communityenergy/index.cfm

Energy Saving Trust
www.est.org.uk/solar

Integration of new and renewable energy in buildings
www.inreb.org/showpage.jsp?page=funding.jsp

Renewable Energy Grants
www.clear-skies.org/

Legislation:
European Energy related legislation
http://europa.eu.int/comm/dgs/energy_transport/index_en.html

Management information and reporting:
Civil Estate Benchmarking Tool
http://projects.bre.co.uk/gpg286/

Corporate Social Responsibility
http://www2.bitc.org.uk/environment/index.html and www.csrforum.com
and www.csreurope.org

Energy Management Statistics
www.opdems.ac.uk/

Environmental reporting
www.defra.gov.uk/environment/envrp/index.htm

Networking and discussion:
HE Estates web site
www.heestates.ac.uk/

HE Energy Network
www.bham.ac.uk/energy-consortium/fhe/

University energy and water management bulletin board
www.jiscmail.ac.uk/lists/energy-management.html

Training:
Institute of Energy
www.instenergy.org.uk/title.htm

Purchasing:
Energy Consortium
www.energy-consortium.com

Publications and reports:
Barriers to energy efficiency in the UK higher education sector
www.sussex.ac.uk/spru/environment/research/barriers.html

Taxation and environmental charging:
Climate Change Levy
www.hmce.gov.uk/business/othertaxes/ccl.htm

International:
Copernicus Campus
www.copernicus-campus.org/

Life Cycle Costing Manual (Handbook 135, National Institute of Standards and Technology)
www.nist.gov/public_affairs/pubs.htm

Reducing Office Equipment Energy Use
http://eetd.lbl.gov/BEA/SF/

Sustainable Development on Campus
http://iisd1.iisd.ca/educate/

User Guide to Power Management in PCs and Monitors
http://eetd.lbl.gov/EA/Reports/39466/

Appendix F
Summary of ShareFair HE energy management network events

Introduction

The higher education energy management network ShareFair was established in 1997. At present there are 130 members registered, representing 110 organisations out of the 140 HEIs in the UK.

The network is based on the principle of learning and building on what other energy managers have already achieved. This avoids duplication, with its associated cost and time lost, while facilitating the flow of useful information on technologies and management practices that have been successful and reasons why others may have failed.

The energy management network employs the following communication routes to achieve this:

- direct contact between members
- ongoing exchange of information between members, by fax and e-mail. A searchable index of e-mail correspondence is available at www.jiscmail.ac.uk/lists/energy-management.html
- three (ShareFair) workshops a year, each of which is adapted to address topics that are raised by attendees and that are of interest to members.

The following three tables list issues considered in Sharefair reports of events, under the headings Communication, Consumption and Cost respectively, between February 2000 and July 2002. Copies of workshop notes are available from networks@bre.co.uk. The 'Contacts' column contains the names of institutions requesting advice/offering help for each issue (in some cases the issues raised were discussed in small groups). Further contact details are provided in the relevant workshop notes.

Communication issues in ShareFair reports

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
Awareness – motivating the student body	Event 9, p17	Discussion group
Effective energy policies	Event 15, p14	HEFCE
Effective energy policies and action plans	Event 9, p16	Discussion group
Energy awareness campaigns	Event 8, p16	York
Energy management training options	Event 12, p8	Anglia Polytechnic, REEO, Bristol
Energy management web-sites	Event 8, p8	Bath, Sheffield, Lincoln and Humberside
Energy managers – scale of appointment	Event 15, p17	Nottingham, Loughborough, University Wales Institute Cardiff, HEFCE
Energy policies and action plans	Event 9, p4	Bath
Energy training for energy managers	Event 15, p16	HEFCE, University Wales Institute Cardiff, West of England, Loughborough, Queen Mary London
Engaging senior management, staff and students in environmental change	Event 11, p3	Bradford, Hertfordshire, UMIST, London School of Economics, Nottingham, Leicester, Cambridge

BEST COPY AVAILABLE

Issue raised	**Workshop notes – event number and page reference**	**Contacts (for further details refer to relevant workshop notes)**
Environment week for staff and students	Event 14, p5	Bristol, Liverpool John Moores, Loughborough, Hertfordshire, Sheffield Hallam, BRECSU
Environmental awareness posters	Event 12, p7	University College London
Gaining SMT support and funding	Event 9, p8	Derby, Bath
Monthly e-mail awareness reminders to staff every 4/6 weeks	Event 8, p15	Sheffield
Networking – mailbase groups	Event 8, p15	Edinburgh
Regulation of energy efficiency	Event 15, p13	Environmental Agency
Showpiece energy conservation schemes	Event 9, p8	Sunderland, Lincoln and Humberside
Site specific advice schemes – BRECSU et al, energy audits	Event 9, p9	Bristol, Bath, Derby
Staff training and awareness	Event 15, p13	Environmental Agency, Bristol
Student projects	Event 9, p15	Sheffield
Student training and awareness	Event 15, p13	Environmental Agency
Student Union/residential awareness scheme	Event 9, p5	Bath, University Wales Institute Cardiff, Liverpool John Moores
Support material – publications and web sites	Event 9, p4	Derby, Lincoln and Humberside, Bristol
User groups	Event 9, p15	Nottingham
VfM from energy managers case studies	Event 14, p14	East London

Consumption issues in ShareFair reports

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
Air entraining showers	Event 15, p22	Northampton, Queen Mary London
Air-conditioning – options	Event 13, p7	Northumbria, Manchester, Southampton
Automatic lighting controls	Event 14, p13	University College London, West of England
Central vs building boiler room	Event 13, p9	West of England, Sheffield Hallam, Northumbria, Edinburgh, Loughborough
CHP sizing software	Event 9, p3	Welsh School of Architecture, Bath
Christmas shut-downs	Event 8, p12	Bath, Manchester Metropolitan
Common carriage of water – Boreholes	Event 10, p12	Queen Mary London, Liverpool John Moores
Continuous treatment of water systems: chlorine or ionisation systems	Event 10, p6	Northampton, Liverpool John Moores
Control of ventilation – heating cooling	Event 11, p7	University College London, Cambridge,

BEST COPY AVAILABLE

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
systems – using presence detection/timing controls		Queen Mary London, Liverpool John Moores, Cardiff, Southampton, Birmingham, Warwick, Nottingham
Decentralisation of boilers	Event 13, p10	Salford, Manchester, Southampton, Leeds Metropolitan
Decentralisation of steam to LPHW	Event 12, p8	Cardiff, Warwick, St Martins College, Dundee
DHW generators	Event 8, p15	Edinburgh
Effective progress reports for senior management down	Event 10, p4	University College London, Northampton, London School of Economics
Energy consumption – Flat panel monitors (FPMs) vs traditional computer monitors	Event 12, p3	Anglia, Liverpool, Cardiff, University College London
Energy consumption of vending machines	Event 10, p12	University of Wales Institute Cardiff
Energy efficient fuels	Event 9, p13	Bath, Cardiff
Energy efficient lighting	Event 13, p5	Sheffield Hallam
Energy savings – compressors	Event 12, p10	Liverpool John Moores, Warwick
Energy savings – oversized motors/pumps	Event 12, p9	Liverpool John Moores, CHEEP, University of Wales Institute Cardiff, REEO
Energy savings for student computing	Event 8, p18	Discussion group
Energy software for student PCs	Event 8, p7	Sheffield Hallam, Warwick, Cambridge, Bath, Middlesex, Lincoln and Humberside, Sunderland
Engine/turbine based CHP and 'turn key' CHP units	Event 11, p10	Edinburgh, Liverpool John Moores, UMIST, Bristol
Fume cupboards	Event 12, p11	University College London, Cardiff
Grey water systems	Event 13, p16	Northumbria, Loughborough, UMIST, Edinburgh
Hydraulic pumps – fitting inverters	Event 12, p9	University College London
Insulation jackets	Event 15, p15	Bristol, Teesside, Loughborough, West of England
Integrating rainwater recovery and usage in campus buildings	Event 9, p14	Sunderland, Cardiff, UMIST, Loughborough, Liverpool John Moores, Derby
Legionella and energy costs	Event 15, p22	Northampton, Hertfordshire, Nottingham, York
Lighting controls	Event 8, p16	Hull
Magnets on boilers	Event 13, p10	York, West of England, Middlesex, Southampton
Motor controllers on freezers	Event 8, p11	Edinburgh, Bath, Middlesex

BEST COPY AVAILABLE

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
Motor management policy	Event 14, p13	Bristol
New build – residence and conference centre – energy requirements	Event 15, p14	University of Wales Institute Cardiff, West of England, Hertfordshire
New student village (900 units) – selection of plant, CHP etc	Event 11, p9	Queen Mary London, London, Manchester Metropolitan, Liverpool John Moores, Cardiff
Passive ventilation	Event 13, p6	York, De Montfort, Coventry, Manchester, Edinburgh, West of England, Leeds Metropolitan, Loughborough, BRECSU
PC screen switch-off	Event 13, p14	UWE, Leeds Metropolitan, UMIST, Southampton, Edinburgh
Photovoltaic air conditioning units	Event 14, p13	Loughborough, Leicester, East London
Photovoltaics	Event 14, p12	Hertfordshire, Northumbria, York, Bristol, Nottingham, Leicester, Southampton, Loughborough
Reducing energy consumption of computers	Event 14, p14	Bristol, University College London, Edinburgh
Reducing toilet cistern volumes	Event 8, p13	UMIST, Edinburgh
Reduction in water consumption	Event 9, p6	Liverpool John Moores
Reliability of automatic light controls	Event 13, p5	UMIST
Renewable energy	Event 11, p8	Nottingham, Cambridge, Edinburgh
Retrofit energy savings and PC's – Developments	Event 10, p8	University College London, Cambridge, Bath
Showerheads – water consumption	Event 13, p17	York, UMIST, Sheffield Hallam, Edinburgh
Split air-conditioning systems	Event 13, p7	Southampton, Edinburgh, Sheffield Hallam, West of England
Termodeck – mixed academic buildings	Event 14, p14	East London
Utility load profiles for campus buildings	Event 8, p5	Welsh School of Architecture
Variable speed drives	Event 13, p11	UMIST, West of England, Sheffield Hallam, Edinburgh
Vending machines	Event 9, p13	University of Wales Institute Cardiff, Cardiff, Sunderland
Water conservation	Event 12, p11	Lancaster
Water conservation in chemistry laboratories	Event 15, p23	York
Water free urinals	Event 9, p6	London School of Economics, Derby
Water savings campaign	Event 8, p14	Liverpool John Moores
Waterless urinals	Event 8, p10	Loughborough, UMIST, Sheffield Hallam, Bath, Edinburgh
Waterless urinals	Event 14, p10	Hertfordshire, Liverpool John Moores, Loughborough

BEST COPY AVAILABLE

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
Wind turbines as an efficient alternative energy source	Event 10, p10	Durham
Wind-powered street lights	Event 14, p12	Nottingham

Cost issues in ShareFair reports

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
Action energy grant scheme	Event 14, p7	Loughborough, Nottingham, Leicester, University College London Liverpool John Moores, Bristol, West of England
Benchmarking and energy audits	Event 15, p12	Hertfordshire, West of England, HEFCE, BRE
Benchmarking for water use	Event 10, p6	London School of Economics
Benchmarking university buildings	Event 15, p12	Bristol
Black boxes for boilers	Event 15, p8	Discussion group
Boiler controls/sequencers	Event 15, p15	West of England, University of Wales Institute Cardiff, Nottingham
Booklets – payback on energy reduction measures	Event 14, p6	Liverpool John Moores, West of England
Building management systems	Event 15, p21	York
Carbon Club/Carbon Trading	Event 14, p11	Bristol, University College London, Loughborough, Edinburgh, Leicester, Brighton
CCL/energy tax	Event 9, p4	London School of Economics
CHEEP – Procurement	Event 11, p4	Liverpool John Moores, Birmingham, Cambridge
CHP best practice	Event 8, p15	BRECSU
CHP development grants	Event 14, p8	Edinburgh
Climate change levy	Event 8, p9	Liverpool
Cost effective – Installing M&T software	Event 8, p18	Discussion group
De-centralisation of energy costing	Event 9, p12	Derby, Leeds, Birmingham, University of Wales Institute Cardiff, Queen Mary London, Southampton, Manchester
De-regulation of water	Event 9, p14	Bristol, Bath
Devolution of electricity	Event 11, p5	Manchester, Bristol
Devolution of energy budgets	Event 15, p17	Queen Mary London, Bristol, Warwick
EDI billing	Event 15, p20	Bristol

BEST COPY AVAILABLE

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
EMS database	Event 8, p15	Edinburgh
EMS software and cost of metering	Event 14, p19	West of England
Energy audit list	Event 12, p5	Liverpool John Moores, Hertfordshire, University College London, University of Wales Institute Cardiff, BRECSU
Energy charging	Event 13, p15	West of England
Energy grants – sources	Event 15, p18	West of England
Energy performance brief for tenders and consultants (covering air conditioning, ventilation and general energy management)	Event 12, p4	University College London, Liverpool John Moores, Sheffield, Anglia Polytechnic, Hertfordshire, Bristol
Energy procurement – regional and national	Event 9, p10	Liverpool John Moores
Energy tariffs	Event 9, p11	Liverpool John Moores, Bath
Enhanced capital allowances	Event 15, p19	York
Figures for replacement of laboratory stills paybacks	Event 14, p9	Edinburgh, Bath, Leicester
Free Trial of 'Data Plus' software	Event 10, p12	Leicester
Gas contracts and pricing	Event 9, p4	Bath
Gas meters – charging according to meter size	Event 11, p4	Southampton, Birmingham, Nottingham, Queen Mary London
Grants for photovoltaics	Event 15, p18	Loughborough, Hertfordshire
Green energy	Event 13, p8	Northumbria, Loughborough, Southampton, Manchester, Leeds Metropolitan
Green energy market	Event 8, p6	Sheffield Hallam, Cardiff, Liverpool John Moores, Loughborough, Sunderland
Half-hourly data	Event 14, p19	Liverpool John Moores
Infra-red aerial surveys	Event 9, p10	Southampton, Sheffield Hallam
Installation of meters	Event 9, p12	Derby, Bath, Bristol
M&T software	Event 8, p8	Central Lancashire, UMIST, Sheffield Hallam, Sunderland, Sheffield, Nottingham, Manchester Metropolitan, Edinburgh
M&T software	Event 13, p13	Manchester, Bristol, Edinburgh
M&T systems	Event 15, p20	Brunel, Hertfordshire, Edinburgh, West of England, Bristol, Nottingham
Maximising benefits from utility de-regulation	Event 9, p7	Hertfordshire
Meter reading using Psion	Event 9, p11	Sunderland, London School of Economics, Nottingham
Monitoring and targeting metering, and remote meter installation	Event 11, p5	Warwick, Southampton, Leicester, UMIST, London School of Economics, Manchester Metropolitan, Liverpool John Moores, Hertfordshire, Cardiff

BEST COPY AVAILABLE

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
Normalising energy targets /savings for devolved/non-devolved energy budgets	Event 8, p5	Bath, Birmingham, Nottingham, Southampton, Sheffield Hallam
NWUPC – discounts on purchasing Danfoss inverter motor drives	Event 13, p18	UMIST
Procurement of all equipment (The Buying Agency)	Event 8, p15	Edinburgh
Reclaiming energy within research costs	Event 8, p16	Sheffield
Reducing meter monitoring costs	Event 15, p22	West of England
Re-investment of energy savings	Event 12, p7	Energy Consortium (CHEEP), Regional Energy Efficiency Office (REEO)
Remote meter reading	Event 12, p12	Leeds Metropolitan
Remote metering systems	Event 15, p21	Bristol, West of England, York, University of Wales Institute Cardiff, Teesside, Warwick
Returns on sewer allowances	Event 12, p12	Cardiff
Savings by increasing boiler temp.	Event 14, p9	West of England, University College London, Leicester, Hertfordshire
Savings from de-centralisation of heating plant	Event 14, p8	University College London, East London, Hertfordshire, Warwick, De Montfort, Edinburgh, Bristol
Scheduling – BEMS	Event 13, p12	West of England, Sheffield Hallam, UMIST
Setting energy targets for new and refurbished buildings	Event 12, p6	Liverpool John Moores, University of Wales Institute Cardiff, University College London, Anglia Polytechnic, BRESCU, De Montfort, East Anglia, Lincolnshire and Humberside
Smart meters – water	Event 13, p16	Edinburgh
Sub-metering – STC M&T software	Event 13, p13	Edinburgh, UMIST, Leeds Metropolitan
Sub-metering systems, BEMS interface	Event 13, p12	Edinburgh, Leeds Metropolitan, Manchester, UMIST
Surface water drainage – rebates/savings	Event 8, p16	Nottingham
Sustainable construction advice – procurement guide	Event 14, p6	Edinburgh, Bristol
Swimming pool costs	Event 14, p10	Liverpool John Moores, Hertfordshire, BRECSU
Tender rounds/ Reverse auctions	Event 13, p15	Loughborough, Edinburgh
VAT on non-business research energy costs	Event 15, p19	Queen Mary London, Cambridge, Nottingham, Brunel, Hertfordshire, Edinburgh

BEST COPY AVAILABLE

Issue raised	Workshop notes – event number and page reference	Contacts (for further details refer to relevant workshop notes)
Water competition	Event 9, p19	Discussion group
Water management tender – questionnaire	Event 12, p12	CHEEP
What use metering?	Event 15, p11	Discussion group

BEST COPY AVAILABLE

Appendix G
Drivers for sustainable estates management in the FHE sector

This paper has been prepared by David Somervell (Energy and Environmental Manager, University of Edinburgh). It has been abridged from the report 'Sustainable Construction Procurement: A Guide to delivering environmentally responsible projects' (Construction Industry Research and Information Association, December 2001).

Introduction

There is a growing realisation and acceptance throughout our society that we need to be more responsible and concerned about our impact on the environment. This is reflected both in the growing national and EU legislation, and in the policies of national and local Government. These trends are augmented by the recent broadening of the idea of responsibility to embrace social, ethical and economic issues along with environmental under the umbrella concepts of Sustainability and Sustainable Development.

The building management and construction industry has been singled out as having perhaps the most significant impact across the EU. It accounts for around half of all energy used, about half of all landfill, has considerable potential to pollute our rivers and generate unacceptable noise and emissions to the air as well as generating a lot of traffic. One driver is the need to help building owners and their building maintenance and construction teams reduce the impact associated with both constructing and operating buildings.

There is now growing evidence of a second, equally strong driver for change. Many of those engaged in construction, and especially the clients who commission buildings, are finding that reducing environmental impact and embracing the broader issues of sustainability make good business sense too. Lower energy use means lower running costs; reduced waste means lower capital cost, lower transport costs and less Landfill Tax. All stakeholders are demanding that the public as well as the private sector improve their practices.

Sustainable development – embracing social and economic issues as well as environmental – applies at the political and macro-economic level to communities, cities, regions and even whole countries. When sustainability is addressed on an individual project the actual impact on society, the economy and the environment are clearly small, but when aggregated over many such projects is significant. The message is, therefore, 'think global – act local'. The idea of sustainability is already infiltrating its way into many aspects of life which are far from political – planning legislation, university curricula in virtually all faculties, and design, manufacturing and management guidance in many industries.

Drivers for change in FHE estate management

1. The building management and construction industry

There is now wide recognition that the building management and construction industry has a vital contribution to make to sustainable development. Sustainable development is about achieving economic and social objectives whilst minimising adverse environmental impacts. The industry has a major role to play in all three respects.

Economically – the building management and construction is a major sector of the United Kingdom economy and a significant source of employment. The Government's strategy for more sustainable construction – 'Building a better quality of life – a strategy for more sustainable construction' (Department of the Environment, Transport and the Regions, 2000) – stated that construction, building materials and associated professional services together account for some 10% of Gross Domestic Product and provide employment for around 1.5 million people.

The Egan Report – 'Rethinking construction' (Construction Research and Innovation Strategy Panel, 2000) - identified critical internal problems within the industry, categorising the sector as a whole as seriously under-achieving, delivering a low and unreliable rate of profitability and a lack of investment in capital, research and development and training. Too many clients are seen as undiscriminating, equating price with cost and selecting designers and constructors almost exclusively on the basis of tendered price. The report also discovered deep and growing dissatisfaction with construction among both private and public sector clients.

Socially – the performance of the industry determines the quality of our built environment and our access to services and recreation. Construction is needed to promote healthy living and socially cohesive communities. Societal expectations generally are changing, specifically in relation to lifestyles and to workplace practices, and the construction industry needs to take account of these changes.

The industry has an ageing workforce and it needs to be able to attract and retain the most able people. It has recognised the need to improve its record in employing women, ethnic minorities and in health and safety.

Environmentally – the construction, use, maintenance and demolition of the infrastructure and buildings consume energy and material resources and generate waste on a massive scale. As a consequence, construction is a major contributor to climate change, resource depletion and pollution at a global level. For example:

- in 1996, the total output of construction was £90 billion
- over 90% of non-energy minerals extracted in Great Britain are used to supply the construction industry with materials
- the annual net change from rural to urban land use is nearly 6,500 hectares, and some 260 million tonnes of minerals are extracted for use as aggregates and raw material for construction products.

Poor design and planning also result in wasted time, money and reduced profits.

2. Climate change

Emissions of greenhouse gases are the prime influence on global climate. The principal source of greenhouse gases is the burning of fossil fuels. United Kingdom targets to reduce greenhouse gas emissions by 12% of 1990 levels have been set under the international Kyoto Protocol and EU agreements. The UK government has a target of 20% reduction in CO_2 by 2010. Recent reports, including 'Energy- the changing climate' (Royal Commission on Environmental Pollution, 2000), have argued that higher targets (of up to 60% reduction in UK greenhouse gases by 2050) still need to be set if environmental catastrophe caused by global climate change is to be avoided.

The increased frequency and intensity of extreme weather events – most specifically flooding and windstorms – are now seen as tangible effects of long-term climate change. Unsustainable planning practices such as developing on flood plains, with inevitable insurance implications, have focused unprecedented public attention on the links between construction and climate change.

Building management and construction is a major contributor to greenhouse gas emissions. Buildings account for more than 330 million tonnes a year of the carbon dioxide released in the UK. Altogether about 50% of our carbon emissions are due to the energy we use for heating, cooling and lighting our buildings. A further 22% of CO_2 releases are accounted for by the energy used in transporting people and goods between buildings. The UK target is to reduce the 1990 CO_2 emission levels by 20% by 2010. It is only a matter of time before all publicly funded organisations are required to make their contribution to this target.

3. Resource depletion and pollution

Every year, the building management and construction industry in the UK:

- consumes 6 tonnes of material per person
- 70 million tonnes of construction and demolition materials and soil end up as waste each year
- 13 million tonnes of the above figure comprise materials delivered to sites that are subsequently thrown away unused
- obtains less than 20% from secondary sources, of the 240 million tonnes of aggregate used.

It is the most frequent industrial polluter of air, water and land. Placed in a global context, building management and construction accounts for one third the world's wood harvest; two fifths of its material and energy usage; and one sixth of its fresh water withdrawals. Sites for construction are also major sources of noise and nuisance and may degrade wildlife habitats and biodiversity.

Water consumption in Britain has risen 70% over the past 30 years. About 30% of potable water could be saved by cost-effective means in buildings.

Key issues

The concept of sustainable development – which endeavours to balance economic, social and environmental factors – is high on the political agenda in the United Kingdom, placing major responsibilities as well as regulatory and fiscal pressures requirements on the building management and construction industry.

Reinforcing and complementing the essential message of the Egan Report – 'Rethinking construction' (Construction Research and Innovation Strategy Panel, 2000) – the Government's strategy for more sustainable construction ('Building a better quality of life – a strategy for more sustainable construction' (Department of the Environment, Transport and the Regions, 2000) focuses on the important contribution the building management and construction industry can make to the achievement of sustainable development by:

- being more competitive and adding longer-term value
- delivering buildings and structures that provide greater satisfaction, well-being and value to customers and users
- shaping patterns of development, including planning communities to reduce car use
- regenerating housing, particularly to revitalise town centres
- minimising its impact on the consumption of energy (especially carbon-based energy) and water
- minimising mineral extraction
- enhancing and better protecting the natural environment including the countryside
- respecting and treating its stakeholders more fairly
- providing training, through targeted schemes.

Many leading clients, most specifically the Government estate, are starting to demand better environmental and social performance from the construction supply chain. The Government's Construction Clients Panel, responsible for 40% of UK annual construction spend, has already established a programme and a timetable to deliver more sustainable construction in all Government procurement.

If the building management and construction industry under-performs from a sustainable development perspective, then the Government has made clear that increased regulatory controls are likely. Organisations that fail to respond will increasingly find their activities constrained and challenged by local objections and increasing requirements from planning and regulatory authorities. Increased risk of litigation and the threat of ever higher insurance costs – and the higher costs of borrowing – will not only impose financial penalties but lead to a loss of market position.

Planning and sustainable development

The principal mechanism by which government enacts policies on sustainable development and the built environment is through the planning system. Local authorities are required to have in place a Regional or Unitary Development Plan (UDP) that sets out their strategies for implementing government policies, against which all development is compared and judged. Generally all proposed construction must comply with these plans.

Environmental issues have been incorporated in UDPs for some time; nowadays sustainability too is addressed, either in a separate section of the UDP, or within other chapters, or both. It is thus increasingly likely that planning applications for all large new construction projects will need to address sustainability and environmental issues. The impact of a construction project on the local environment and community is assessed by means of an Environmental Impact Assessment and presented in an Environmental Statement which accompanies the planning application.

Local Authorities are now charged with monitoring their progress in implementing Government Policies on sustainability, and many are now devising and implementing their own performance indicators, both for their region as a whole and for construction in particular.

Case for sustainable construction & estate management

Whilst legislation and fiscal pressure will continue to be important drivers of better performance, the business case for sustainable construction and building management is becoming increasingly widely recognised. The long-term business benefits in managing the economic factors affecting business, and the environmental and social factors as well, will become ever more obvious as fiscal and regulatory drivers are introduced and as sustainability becomes a key competitiveness issue.

1. Reducing costs

The quantifiable cost savings possible through improved utilities management, leaner, more eco-efficient building design and construction, reduced waste and re-use of resources are considerable whilst the use of locally-sourced materials cuts transport costs reduces pollution.

Energy efficient designs substantially reduce lifetime costs, making property a more attractive and affordable resource for the sector. In terms of capital costs, there is evidence that sustainable construction does not inevitably have to cost more, even if the cost profile may be different from that of a conventional project.

2. Reducing risk and increasing productivity and staff motivation

Improved risk management and addressing of compliance issues can lead to reduced liability and a minimisation of the financial penalties and negative publicity associated with non-compliance. The use of locally sourced materials reduces supply-failure risks. Sustainable institutions will invest in an increased capacity to innovate, leading to improved efficiency and reduced waste which meet the diverse needs of occupants and the environment.

Well-designed and appropriately heated and lit buildings enhance productivity and increase employee motivation, in addition to improving the quality of the working environment of staff and students. Institutions

showing a 'respect for people' have a greater capacity to retain able staff, reducing recruitment, training costs and loss of institutional knowledge. They are also likely to recruit the most able staff.

3. Enhanced public relations and community liaison

Wider business benefits can arise from effective working with local communities. By building close relations with local communities considerable savings can be achieved during the planning process or mutually favourable working arrangements negotiated. By acquiring a licence to operate, costs arising from addressing protests and complaints can be minimised. On the other hand, poor sustainability performance – especially in an increasingly competitive market for students and research funds – imposes opportunity costs in terms of loss of confidence and competitiveness.

The responsible institution

A commitment to sustainability requires institutions to adopt responsible social, economic and environmental policies and practices. Responsible institutions need to be more aware of the issues, find mechanisms for becoming more resource efficient, and contribute towards a more sustainable way of life for all.

For many institutions this means making significant changes in the way they operate. Moving towards a more sustainable model will involve seven key transformations in the way organisations operate. The shifts that will be needed across the seven key aspects of business practice are shown in Table 1:

Table 1

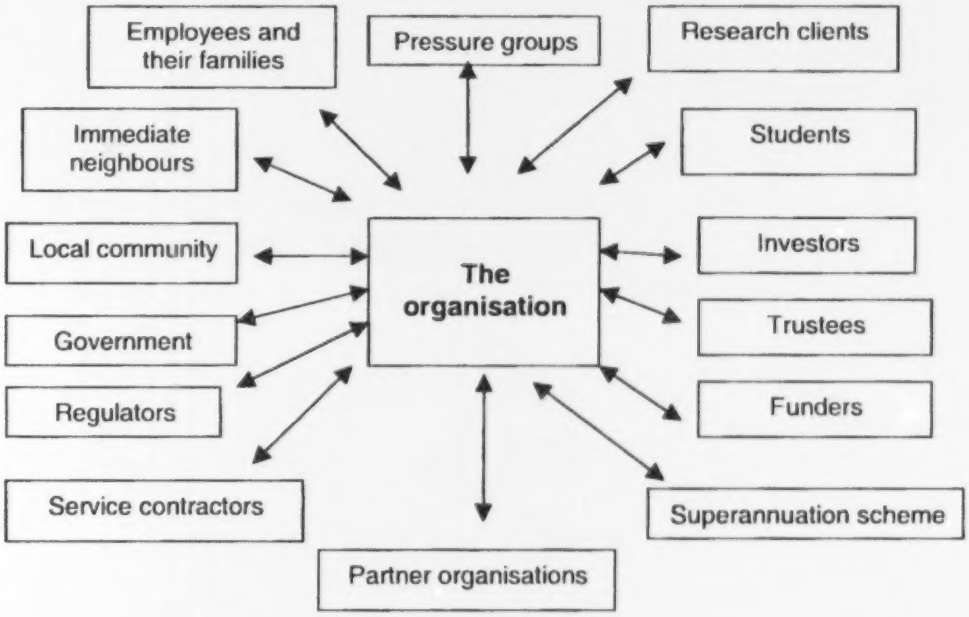
Aspect of institution	From	To
Markets	Compliance	Competition
Values	Hard commercial	Softer, triple bottom line
Transparency	Closed	Open
Life cycle	Product	Function
	Point-of sale	Life time responsibility
Partnerships	Subversion	Symbiosis
Time	Short	Long
	Narrow	Wide
Corporate governance and stakeholder relationships	Exclusive	Inclusive

(Adapted from Cannibals with Forks by Elkington)

BEST COPY AVAILABLE

Stakeholders are defined as those people who are affected by – and affect – an organisation's activities. The typical stakeholders to whom a 'sustainable' organisation would need to demonstrate responsibility – through its hierarchy of policies, plans and reporting procedures – are detailed in Figure 1.

Figure 1



Institutional sustainability policies

The principal means by which a organisation can fulfil its commitment to sustainable development is to set down its vision in a sustainability policy and following an appropriate strategy for achieving it. This is best undertaken by subdividing the larger aims into a series of narrower ones.

The components of an overall sustainability framework can be integrated as follows (Figure 2):

Figure 2

Sustainability policy
incorporating a **Vision Statement** and an
Implementation and Management Strategy

Social policies	Economic policies	Environmental policies
• Social responsibility • Community relations • Health and safety • Ethical • Equal opportunities	• Economic performance • Resource management • Training • Egan • New deal	• Energy • Water • Transport • Waste & pollution • Biodiversity
Targets and implementation plans for each performance area, expressed through indicators		
Benchmarking each performance area against industry good practice		
Systems for managing social, economic and environmental performance		
Sustainability report, incorporating reports on social, economic and environmental performance		

BEST COPY AVAILABLE

The sustainability performance management system (illustrated in Figure 2) is only effective if organised as a closed loop or cycle (see Figure 3) and implemented through action plans for each policy area (Figure 4).

Figure 3

This model is consistent with the management cycle advocated by the International Council for Local Environmental Initiatives (ICLEI, 1999) and with the procedures proposed as part of MACC2 – Making a Corporate Commitment. This Government-sponsored initiative is designed to promote top-level corporate commitment to sustainable business practice and to an improved environment (DETR, 2000).

1. Making a corporate commitment

MACC2 requires companies to commit to one or more of three issues: Greenhouse Gas emissions, Waste and Water. Organisations have the option of including improvement targets in other important areas such as Raw Materials Use, Emissions of Other Gases, a Green Travel Plan or actions to implement a Biodiversity Action Plan. The commitments made by an organisation need to reflect national targets.

The United Kingdom overall is working towards:

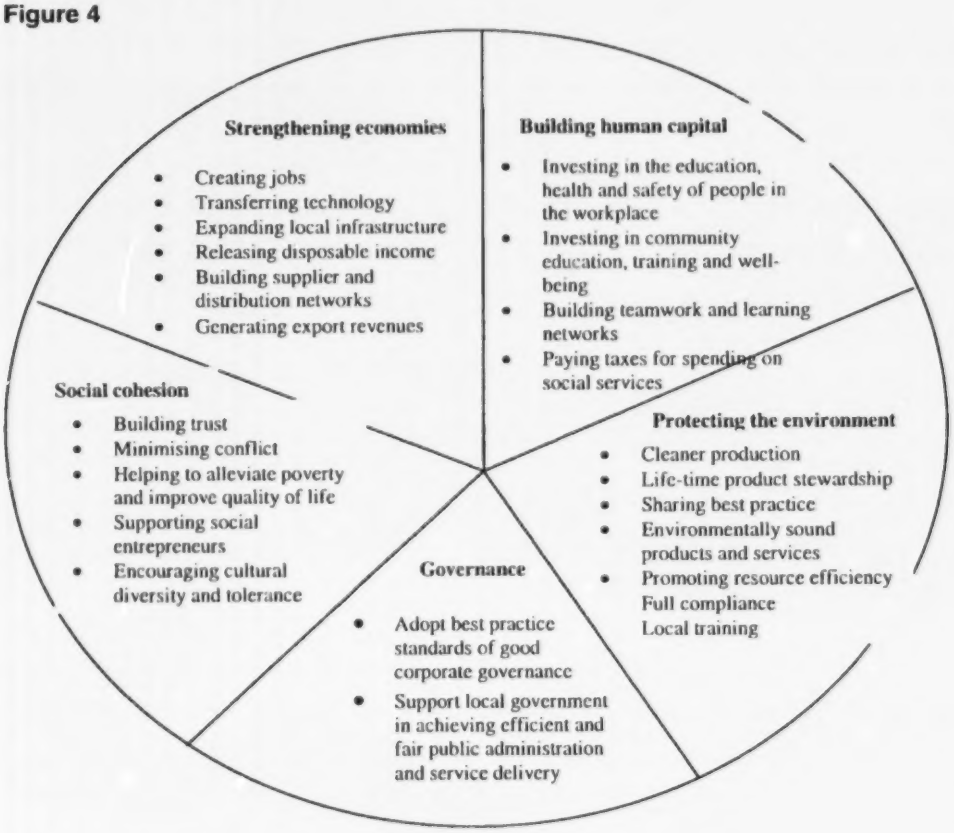
- recovering 55% packaging waste by 2001
- reducing landfill by 12% in England and Wales on 1998 levels by 2005
- reducing ammonia by 11% on 1990 levels by 2010.
- reducing CO_2 emissions by 20% relative to 1990 levels by 2010
- reducing volatile organic compounds (VOCs) by 53% on 1990 levels by 2010
- reducing nitrogen oxides by 56% on 1990 levels by 2010
- reducing sulphur dioxide by 83% on 1990 levels by 2010.

Effective sustainability management requires understanding an organisation's social, economic and environmental impact and formulating a coherent set of action plans to deliver continuous improvement in the key performance areas. Such plans need to be based on a sound business case. At the highest level this means ensuring a good fit between overall business strategy and the Sustainability Action Programme. At the operational level it is important to integrate sustainability plans into day-to day business activities.

To implement a Sustainability Policy and the programme by which it is realised, it is important the organisation takes full ownership of the objectives. This is best achieved when the organisation itself devises

the policy. A policy is not likely to succeed if it is taken from another organisation and imposed. At present, for instance, different organisations use the words 'sustainability' and 'environmental' differently and sometimes interchangeably.

Figure 4


Strengthening economies
Creating jobs
Transferring technology
Expanding local infrastructure
Releasing disposable income
Building supplier and distribution networks
Generating export revenues
Building human capital
Investing in the education, health and safety of people in the workplace
Investing in community education, training and well-being
Building teamwork and learning networks
Paying taxes for spending on social services
Social cohesion
Building trust
Minimising conflict
Helping to alleviate poverty and improve quality of life
Supporting social entrepreneurs
Encouraging cultural diversity and tolerance
Protecting the environment
Cleaner production
Life-time product stewardship
Sharing best practice
Environmentally sound products and services
Promoting resource efficiency
Full compliance
Local training
Governance
Adopt best practice standards of good corporate governance
Support local government in achieving efficient and fair public administration and service delivery

Case study: Sustainability policy, University of Edinburgh

In 1993 the University of Edinburgh was one of the first higher education sector institutions in the UK to publish a corporate environmental policy. Subsequently, the university has developed a complementary set of policies and plans relating to key areas of performance such as Energy, Waste Reduction, Health and Safety and Travel. Each of these policy headings now sit within a coherent management framework provided by an overall University Sustainability Policy, adopted by the University Court in June 2000.

Sustainability Policy 2000

The University of Edinburgh identifies sustainable development as development 'meeting present needs without compromising the ability of future generations to meet their own needs'. Sustainability is a process of ensuring the wise use of all resources within a framework in which environmental, social and economic factors are integrated.

The university is committed to placing sustainability at the heart of its mission:

- making sustainability integral to the delivery of research, teaching and operational objectives
- taking positive actions promoting continual environmental improvement
- setting and achieving clearly defined sustainable development objectives and targets.

BEST COPY AVAILABLE

The university seeks to build on its Environmental Policy of 1993 and undertakes to:

1. *Make sustainability a corporate priority by:*

- encouraging students and staff to incorporate informed sustainability perspectives within their work
- developing the capacities of academic staff to promote understanding of the principles of sustainability.

2. *Develop and deliver appropriate teaching and research by:*

- exposing all students to concepts of social, ecological and ethical stewardship
- supporting and encouraging interdisciplinary research into issues of sustainable development.

3. *Take a leadership role in sustainability by:*

- setting best practice standards, meet or surpass requirements of environmental legislation and commit to a process of continual environmental improvement
- promoting awareness of all legislative, economic, technical and market developments that assist progress towards sustainability
- establishing an Advisory Group to oversee implementation of this policy and associated programmes.

4. *Contribute to stable community building by:*

- building partnerships and create local information and learning networks for sharing experiences and knowledge of sustainability issues with all stakeholders
- operating in ways that maximise social and economic benefit while minimising any adverse impacts to the local community
- investing in staff development, value stakeholder involvement and promote social inclusion and equity.

5. *Maintain and develop the university in a sustainable manner by:*

- promoting continual improvement in maintenance practices and establish sustainability guidelines for internal and external design teams and contractors working on new build and refurbishment projects
- developing procurement procedures with all elements of the supply chain to ensure social, ethical and environmental criteria are integrated into programmes aimed at achieving best value
- maximising the efficient use of energy and materials, continually improve pollution prevention measures and increase use of renewable resources
- minimising waste generation in research and teaching activity and encourage repair, reuse and recycling ahead of the responsible disposal of surplus materials
- promoting practical measures to reduce the impact of travel to and between university sites.

6. *Monitor and report on progress towards sustainability by:*

- managing responsibly the social, environmental and economic impacts of all university policies and practices and assess potential improvements within the university's decision-making processes
- conducting reviews of all university policies, management performance standards and operations against internal sustainability targets and best practice standards
- making the results of social, environmental and sustainability audits and impact assessments carried out by or for the university available to all stakeholders.

Case study: Environmental policy, Carillion Group

The Carillion Group is committed to:

- continuing environmental improvement, by implementing business-specific environmental management systems
- developing objectives, supported by detailed targets to manage all potentially significant environmental aspects
- preventing pollution and monitoring and reducing any adverse impact of the groups' operations on the environment and local community
- demonstrating efficiency in the use of energy, water and materials, as well as taking appropriate opportunities to minimise waste and re-use and recycle wherever possible
- developing meaningful performance indicators to measure resource use, waste and emissions as well as promoting environmental best practice
- complying with all relevant environmental legislation, other environmental regulations and standards of relevance to the industry sectors in which we operate
- training of staff, suppliers and contractors to enhance awareness of relevant environmental issues and ensuring effective management of our environmental impacts
- working in partnership with our suppliers to ensure effective environmental supply-chain management and to promote sustainable sourcing of products and materials
- seeking to influence the environmental impact of our final constructed product through enhancement of environmental specification and design
- working in partnership with our customers to promote the adoption of best practice environmental management techniques to deliver high-quality products and services
- establishing two-way dialogue with all who have an interest in our business, including staff, suppliers, customers, investors, shareholders, appropriate authorities, local communities and other organisations, to identify key environmental issues and to seek innovative solutions and appropriate alternatives
- publishing information on environmental performance, gaining third-party endorsement of published performance and benchmarking this performance against others.

Management of sustainability issues

Taking a systematic approach to the management of environmental and social as well as economic issues associated with an institution's teaching, research and estates practices is an essential requirement for a responsible organisation. Strategic environmental management helps senior HE managers understand and assess environmental risks and opportunities. On this basis they can make more informed decisions about facilities and processes.

An environmental management system (EMS) such as ISO 14001 or the EU Eco-Management & Audit Scheme (EMAS) is a systematic approach to dealing with the environmental aspects of an organisation or a project. It provides a framework for ensuring that action plans formulated to deliver good practice sustainability performance are effectively implemented. It is a 'tool' that enables an organisation of any size or type to control the impact of its activities, products or services on the natural environment.

1. Elements of an environmental management system

An EMS usually begins with Preparatory Environmental Review followed by an Environmental Policy. From this grows an action plan, including performance target to be attained. The performance is assessed and finally reviewed in line with the policy. This cyclic sequence of 'plan, action, measure and review' is characteristic of environmental management systems. It is, of course possible to join the cycle at any point, and some companies implement their EMS before a policy has been finalised.

2. Benefits of an environmental management system

An environmental management system is a tool and is only as effective as the people using it. Implementing an EMS brings different benefits to different players in the building management and construction process.

Estates managers may benefit most from:

- demonstrating to internal clients a commitment to environmental management
- meeting certification criteria and obtaining permits and authorisations
- obtaining insurance at lower cost
- helping control and avoid environmental impacts.

Internal clients, on the other hand, may benefit more from:

- satisfying funding criteria and improving access to grants
- enhancing stakeholder image
- demonstrating to construction service providers their commitment to environmental issues.

3. Disadvantages of an environmental management system

Like all management, environmental management systems take some time and resources to establish, run and review. Before introducing an environmental system be very sure that you have fully assessed the costs involved to balance against the benefits to be gained.

4. Case for certification

Whilst any responsible organisation is likely to require a formal system of some kind to manage its environmental impacts, not everyone needs a system which is independently audited in order to obtain third party certification. Where this is deemed necessary – in order to gain credibility in the eyes of others, for example – a system such as ISO 14001 or EMAS will need to be adopted. This process can add additional management costs.

Before deciding whether to seek formal certification for its systems, an organisation should be certain that it fully understands that certification cannot be used as a guarantee that their products or services are environmentally responsible – only that it has a certified environment management system in place.

Systems such as ISO 14001 were originally conceived to apply to companies whose operations have significant direct environmental impacts such as the potential to pollute. However, there is now growing recognition that they might have wider, indirect application. For example, when applied to firms such as architects, consulting engineers and quantity surveyors and contractors whose activities have significant indirect environmental impacts through the products they specify and install.

Case study: ISO 14001 certification, Morrison Construction

In 1999, Morrison Construction gained ISO 14001 certification, having recognised a number of internal and external drivers:

Internal:

- caring for the environment
- improving of the company's image
- desiring to be a market leader
- improving company performance
- achieving cost savings
- providing commercial opportunities.

External:

- legislation
- costs and taxation
- clients' requirements
- investors and insurers
- employees
- neighbours.

Morrison's environmental management system includes assessing the environmental impact of all projects undertaken. For example, estimators, planners and designers are required to adopt environmental checklists that included an assessment of each project with regard to indicators for water, nuisances, resource efficiency, etc. Environmental targets were set for these indicators based on legal compliance and best practice methods. The company reviews its achievements against these targets and produces regular company environmental reports.

Annual reporting

A sign of a responsible organisation is a willingness to report its performance to its stakeholders. Producing annual sustainability or environmental reports is now accepted as good business practice and may well be a requirement of any formal environmental management system which an institution operates.

To be effective and meaningful, annual reporting must be part of a communication strategy and involve benchmarking of performance against sector good practice standards. To this end sustainability indicators provide an important component of the process of measuring, managing and reporting performance.

Case study: Sustainability Indicators, Scottish Homes
Scotland's National Housing Agency, Scottish Homes, commissioned a study designed to test the operational readiness of their sustainable development policy as an effective instrument for delivering sustainable development within the social housing sector in Scotland. A key outcome of the study have been the definition of a set of key sustainability performance indicators and associated targets.

Amongst the recommendations was the proposal that Scottish Homes should adopt a set of key performance indicators and targets for social housing. These would be applied across the agency's funded development programme and be translated into targets for each Registered Social Landlord (RSL) seeking funding.

Indicators and targets would allow for the measurement of the sustainability performance of each RSL organisation, its overall development programme and each individual project. Both indicators and targets should be reviewed on a regular basis, with a view to revising targets upwards in line with current best practice and as a means of driving continual improvement within the sector.

Each RSL in receipt of Scottish Homes funding should be required to produce and publish via the proposed sustainable housing network web site, an annual sustainability report providing an objective assessment of its development programme through the appropriate application of the Housing Quality Assessment Program. Such reporting correlates with the national sustainability indicators adopted by Scottish Homes with respect to their whole funding programme.

Environmental or sustainability reporting promotes dialogue with stakeholders, demonstrating to clients, lenders, investors, insurers, customers and the wider community within which it operates that an organisation is being well-run and is seeking to reduce risks and future liabilities.

Effective annual reporting is an opportunity to show that a company is not simply complying with regulations but is adopting a leadership role in seeking to improve performance continuously in anticipation of future

change – future-proofing. Environmental reporting can empower stakeholders with the information they need to hold organisations accountable by enabling environmental performance to be measured against statements of environmental principles and industry good practice.

Environmental and sustainability reporting should be for internal as well as external consumption, encouraging staff and students to apply good practice and serving as a driver for continuous improvement. As the following examples show, annual reports differ in their detail and emphasis as a reflection of an organisation's business sector and its own attitudes to sustainability and the environment.

Case study: Environmental report, Skanska
Skanska is one of the world's leading construction companies, employing nearly 40,000 people and operating in more than 50 countries. Its annual environmental report reviews its environmental performance in accordance with its environmental policy and EMS. This includes the activities of the many divisions with the firm, both in Sweden, the rest of Europe and the USA, many of which have now independently gained ISO14001 certification.

A number of articles also serve to educate readers (eg, employees and shareholders) about the environmental issues that the firm has been addressing, such as the environmental impact of construction processes and existing buildings, as well as how the firm applies its environmental philosophies to its own building stock.

References

'A better quality of life' (Department of the Environment, Transport and the Regions, 1999)

'Achieving excellence' (Government Construction Clients' Panel, 1999)

'A commitment to people – our biggest asset' (Movement for Innovation, Respect for People Working Group, 2000)

'Building a better quality of life – a strategy for more sustainable construction' (Department of the Environment, Transport and the Regions, 2000)

'Building for a sustainable future: construction without depletion' (Construction Industry Research & Information Association, 1999)

'Building sustainably – a stakeholder approach to building design' (Masero, S, 1999)

'Climate change – the UK programme' (Department of the Environment, Transport and the Regions, 2000)

'Construction best practice programme – a fact sheet on sustainable construction' (Construction Industry Board and Department of the Environment, Transport and the Regions, 1998)

'Energy- the changing climate' (Royal Commission on Environmental Pollution, 2000)

'Greening the boardroom: corporate environmental governance and business sustainability' (Ledgerwood, G, Greenleaf Publishing, 1997)

'Integrating sustainability' and 'Rethinking construction' (Construction Research and Innovation Strategy Panel, 2000)

'MACC2: a corporate commitment to sustainable business practice and an improved environment' (Department of the Environment, Transport and the Regions, 2000)

'Sustainable construction: a Scottish perspective' (Talbot, a position paper prepared for the Scottish Office, 1998)

'The implications of climate change for the insurance industry: an update and outlook to 2020' (Crichton D, edited by Salt JE, 2001)

'Towards sustainability – a strategy for the construction industry' (Sustainable Construction Focus Group, 2000)

Appendix H
External drivers for integrating sustainability into estates management in the HE sector

This appendix is a commentary on six programmes that are likely to have a significant impact on the way in which energy is used in the UK HE sector. It was first written in January 2002 and then updated in April 2003 by Dr Ian Knight of the Welsh School of Architecture, Cardiff University.

The programmes likely to have an impact on the way the HE sector it manages its estate with regard to energy use, cost and procurement of buildings are indicated. The list is not exhaustive.

The programmes are:

a. EC directive on the energy performance of buildings.

b. UK Government's White Paper: Our energy future – creating a low carbon economy (February 2003)

c. New Part L of the Building Regulations – effective 1 April 2001.

d. UK Government's Sustainable Development Commission.

e. UK Government: DTI and sustainable construction.

f. Market transformation programmes.

a. EC directive on the energy performance of buildings

Web address: http://europa.eu.int/eur-lex/en/lif/reg/en_register_121020.html

Draft directive published in May 2001, consultation period finished 26 October 2001. The directive was passed on December 16, 2002. To be implemented by 4 January 2006.

A major document presenting the Commission's legislation on the standards that new buildings, and those buildings undergoing major refurbishment, must reach.

The importance of this document cannot be overstated, and it is recommended that all estates staff with responsibility for areas that impact on energy consumption, are made aware of it.

Main elements are:

- **Establishing a common methodology for calculating the integrated energy performance of buildings.** Most HE institutions will probably have to input data for their entire estate into a common format, so that any physical changes proposed to any building on that estate can be run through the model/procedure to ensure that the most efficient and low energy option is chosen, and that indeed the changes desired cannot be achieved some other way. Education buildings are identified as a separate category. Institutions will have to show that they have considered passive solar design, renewable energy systems, combined heat and power and district heating schemes within options analysis.

  Comment The 'teeth' to this element will be dependent on the minimum acceptable methodology that can be employed, so it is too soon to know what effect this might have on the procurement and running of existing buildings.

- **Setting of energy performance requirements.** Article 4 of the new directive requires that:

  'Member-states shall take the necessary measures to ensure that minimum energy performance requirements for buildings are set, based on the methodology referred to in Article 3. When setting requirements, Member-states may differentiate between new and existing buildings and different categories of buildings.'

  Comment For the HE sector, this should involve the sector actively establishing its own benchmarks for differing types of building and end-uses. Otherwise the worst-case scenario might involve inappropriate benchmarks being set by external bodies.

- **Minimum standards for the energy performance of new buildings and minimum standards for the renovation of existing buildings.** This is similar to the changes that came into force on 1 April 2002 – update to UK Approved Document Part L. Essentially, as well as applying to new buildings, any major works to an existing building over 1000m^2 will be required to meet the new directive. The requirements are:

  'Major renovations of existing buildings above a certain size should be regarded as an opportunity to take cost effective measures to enhance energy performance. Major renovations are cases such as those where the total cost of the renovation related to the building shell and/or energy installations such as heating, hot water supply, air-conditioning, ventilation and lighting is higher than 25% of the value of the building, excluding the value of the land upon which the building is situated, or those where more than 25% of the building shell undergoes renovation.'

  Comment This sounds fairly easy to avoid, but is an indication of the way things are heading.

- **The issuing of energy performance certificates for public buildings.** It is unclear if an institution or university is a public building, but probably is in the context of the following:

  'Public authority buildings and buildings frequently visited by the public should set an example by taking environmental and energy considerations into account and therefore should be subject to energy certification on a regular basis. The dissemination to the public of this information on energy performance should be enhanced by clearly displaying these energy certificates. Moreover, the displaying of officially recommended indoor temperatures, together with the actual measured temperature, should discourage the misuse of heating, air-conditioning and ventilation systems. This should contribute to avoiding unnecessary use of energy and to safeguarding comfortable indoor climatic conditions (thermal comfort) in relation to the outside temperature.'

  Comment Again, it is unclear whether this will have much impact, unless the energy certificate states very clearly that a building is performing well or poorly. This might then provide some pressure on institutions by their staff and students.

- **Regular inspection of boilers and air-conditioning (A/C) systems.** Part of this inspection for efficiency will consist of recommendations for either doing away with the system altogether (for example, shading instead of A/C systems), or changing to a more efficient method such as a district heating scheme.

Comment Problems over definitions, for example 'competent persons', are likely to mean this provision takes a while to mature into a threat, if it ever does. However, if it does prove to have teeth, then the potential cost implications for institutions could be very large.

b. UK Government's White Paper (Cm 5761): Our energy future – creating a low carbon economy (February 2003)
Document available at: www.dti.gov.uk/publications/whitepapers.htm

This whole document is the first time that energy has been put at the heart of the UK Government's policy. Its main point is probably best encapsulated in the following statement:

> *'We therefore accept the Royal Commission on Environmental Pollution's (RCEP's) recommendation that the UK should put itself on a path towards a reduction in carbon dioxide emissions of some 60% from current levels by about 2050.'*

Comment There is a lot of wishful thinking in the document, with few hard policies as yet. However, the intention has been clearly stated – the status quo of energy consumption patterns is not an option. To achieve a reduction from current levels of 60% will require a seismic change in attitudes, but is achievable within current technology, and at no great additional cost in a well-designed building. The year 2050 is not a long way away, and gas and oil are not forecast to last until then. So how will you keep your institution operational? A low-energy consuming design will certainly be useful, but what about the institution's existing buildings? A long-term investment and procurement strategy will help prevent 'short-termism', which potentially could blight the long-term prospects of many universities and colleges.

c. New Part L of the Building Regulations – effective 1 April 2001

The new Parts L1 and L2 of the Building Regulations can be downloaded in pdf format from:
www.safety.odpm.gov.uk/bregs/building.htm
The statutory requirements of the new guidance are:

Buildings or parts of buildings other than dwellings:

L2. Reasonable provision shall be made for the conservation of fuel and power in buildings or parts of buildings other than dwellings by:

a. Limiting the heat losses and gains through the fabric of the building.

b. Limiting the heat loss:

i. from hot water pipes and hot air ducts used for space heating;

ii. from hot water vessels and hot water service pipes.

c. Providing space heating and hot water systems which are energy-efficient.

d. Limiting exposure to solar overheating.

e. Making provision where air conditioning and mechanical ventilation systems are installed, so that no more energy needs to be used than is reasonable in the circumstances.

f. Limiting the heat gains by chilled water and refrigerant vessels and pipes and air ducts that serve air conditioning systems.

g. Providing lighting systems which are energy-efficient.

h. Providing sufficient information with the relevant services so that the building can be operated and maintained in such a manner as to use no more energy than is reasonable in the circumstances.

Requirements L2e and f apply only within buildings and parts of buildings where more than 200m^2 of floor area is to be served by air conditioning or mechanical ventilation systems.

Requirement L2g applies only within buildings and parts of buildings where more than 100m^2 of floor area is to be served by artificial lighting.

Comment The parts highlighted in bold are the main areas that have changed since the last regulations. The onus seems to be on the HE sector to show how we have met these requirements.

There is also a requirement for sub-metering of major building services and occupancy energy consumption – though the current Building Regulations cannot demand that they are read at present (though see '*a. EC Directive on the energy performance of buildings*' – requirements for energy certificates and regular performance checks on boilers and A/C systems). It seems that it is only a matter of time until these meters must be read and recorded. Therefore, institutions may as well specify efficient services now, that will provide a comfortable return, save money now and in the future from reduced consumption, and not having to replace it prematurely.

d. UK Government's Sustainable Development Commission

Web address: www.sd-commission.gov.uk/index.htm

This independent advisory body was established in October 2000. It reports directly to the Prime Minister and the heads of the devolved governments and assemblies.

In its own words:

'Our mission is to inspire sustainable development in government, the economy and society. Our task, given by government, is to advocate sustainable development across all sectors in the UK, review progress towards it and build consensus on the actions needed if further progress is to be achieved. Established in October 2000, we report jointly to Tony Blair and the leaders of the devolved administrations in Wales, Scotland and Northern Ireland.

The UK Government has set out four objectives which, if achieved at the same time, would deliver sustainable development in the UK:

- *Social progress which meets the needs of everyone.*
- *Effective protection of the environment.*
- *Prudent use of natural resources.*
- *Maintenance of high and stable levels of economic growth and employment.*

Our strategic objectives are:

- *To advocate a compelling vision of a sustainable economy and society.*
- *To review how far sustainable development is being achieved in the UK across all sectors.*
- *To identify the opportunities for, and obstacles to, step changes for sustainability by government, business and the media.*
- *To promote mechanisms that will deliver a sustainable society.*
- *To advance innovative approaches to policy-making and encourage wider participation.*
- *To mainstream the principles and practices of sustainable development and to support and encourage leadership and best practice in all sectors of society.'*

Comment The likely direct impact of this body on the HE sector is nebulous at present, and can probably be ignored for now. Any recommendations that do come out of it are likely to end up being fed into the legislative system through more established routes such as the Building Regulations. However, the UK environment ministry has released a study evaluating different ways of measuring resource efficiency. Completed last year, the analysis fed into a report from the Prime Minister's office in November 2001. This recommended a major effort to improve resource productivity, but questioned the value of existing overall measures such as Factor 4 and ecological footprinting. Resource efficiency is a growing political priority across Europe, stoking increasing debate in how to measure progress. The report can be seen at:
www.defra.gov.uk/environment/sustainable/research/prosperity/pdf/sustainable_prosperity.pdf

Not an immediate concern, but again an indication of long-term postures being adopted.

e. UK Government: DTI and sustainable construction

Web address: www.dti.gov.uk/construction/sustain/index.htm

Following consultation with the industry, the Government published *'Building a better quality of life – a strategy for more sustainable construction'* in April 2000.

Sustainability is also the key theme of the DTI's construction research and innovation programme. For more details see '*Research innovation and best practice*'.

The Minister for Energy and Industry launched in October 2001 a report reviewing progress in achieving more sustainability construction: *'Building a Better Quality of Life – A Strategy for More Sustainable Construction: Report on Progress 2001.'*

Comment Again, this is in its early stages of formulating policy and from a purely compliance viewpoint can be discounted for a while.

However, with both this initiative and the previous one, as well as the links to EU initiatives in this area, it is clear that the HE sector will have to start giving serious thought to establishing a general energy and environmental strategy that encompasses not only operational issues, but also procurement and disposal of buildings and materials during the course of its operations.

f. Market transformation programmes

Web address: www.mtprog.com/Feature1.aspx

These initiatives are aimed at altering the way in which various markets operate so that energy and environmental issues are moved to the fore. I am currently involved with the air conditioning market transformation programme.

In its own words, the purpose of the Market Transformation Programme (MTP) is to:

> *'...support a structured, public domain sector review process. This is conducted in partnership with business, consumers, experts and other bodies to discuss market projections and policy scenarios that will help to bring forward products, systems and services which do less harm to the environment and use less energy, water and other resources. The MTP website aims to encourage public awareness and scrutiny of current policy thinking, promoting openness, transparency and joined-up government.'*

The programmes cover domestic and non-domestic products. Currently, the non-domestic product programmes are:

- commercial refrigeration – air conditioning and refrigeration
- electric motors (including variable speed drives)
- variable speed drives
- commercial lighting
- office equipment.

The key objectives of MTP are to provide:

- a market transformation rationale and structured environment for identifying the key issues that determine resource efficiency, for constructing robust policy solutions and for monitoring the outcome
- a reference knowledge base of reliable information, current analysis and working assumptions
- up to date briefing notes on key issues and current developments
- an informed consensus on the potential for change, the policy options and the priority actions.
- accessible, public information on policy direction and likely outcomes via www.mtprog.com
- support for specific policy initiatives and for wider policy programmes.

A key feature of the programme is the clear illustration of current thinking and likely outcomes by the use of market projections and policy scenarios. This helps to 'reality test' the explicit market transformation policy rationales against consumer expectations and industry's own business plans. The main deliverable and focus for the sector review is a revised Policy Brief – a clear statement of the issues, priorities and actions needed to deliver quantified improvements in resource efficiency over time. The Policy Brief is a public domain document and is intended to be referred to in policy discussions and in support of government decisions.

Current versions of policy briefs for domestic and non-domestic products are available at www.mtprog.com/PolicyBriefs.aspx and briefing notes at www.mtprog.com/BriefingNotes.aspx

MTP's current focus is on improving the delivered energy performance of domestic and non-domestic products, especially energy consuming appliances, equipment and components. We have established sector reviews in 10 major sectors, covering 27 product types, representing 75% of UK electricity consumption. These include all major domestic energy consuming appliances (lighting, heating, cold, wet, cooking and consumer electronics) and traded goods in the commercial sector (office equipment, motors and drives, lighting and commercial refrigeration).

The programme now incorporates DEFRA's work in support of Ecolabelling and we have recently opened a new programme to look at household water consumption.

UKEPIC (www.ukepic.com) is a new initiative to provide access to reliable public domain product information and will support a variety of key policy measures such as labelling, buyers' guides, standards and green procurement. DEFRA is exploring the scope for dealing more generally with broader environmental and integrated product policy issues under this programme.

Comment What this means is that a lot more energy labelling information is going to be made available, and that this will be expected to be used in support of the requirements of Part L of the Building Regulations and the EC directive noted earlier.

Conclusion

From the above, and given current, and likely medium-term, interest rates it would seem pointless leaving money in the bank when, from a financial viewpoint, more significant returns can be made by investing in proven energy efficiency measures.

If we now couple this financial fact with increasingly stringent regulations and requirements due just around the corner, then it seems like madness not to be whole-heartedly embracing environmental concerns within the higher education sector. This is before the moral and environmental issues are even considered.

A further point concerns the design of new building and refurbishment schemes. Universities are unlike commercial concerns in that they can rarely move to an area or set of buildings that provide cheaper labour and running costs. They are identified with an area and, sometimes, with a set of buildings. It would therefore seem eminently sensible to be procuring new buildings that have 'presence' – low running costs, flexibility and longevity 'built-in' to their design – even if that might mean slightly increased 'up front' costs. Over the time periods that universities should be intending to operate, the increased difference in cost between a good, landmark building and a stock solution is practically insignificant. In fact, the more expensive building is probably the cheaper investment as it can be marketed internationally as part of the attraction of the establishment.

As far as refurbishing buildings is concerned then again the emphasis should be on maximising the potential of the existing building within reasonable financial guidelines. For example, fabric improvement measures should be made as energy efficient as possible as they are likely to be around for the life of the building, whereas lighting refurbishment measures should return their investment and some savings within the average lifespan of the system.

Most financial and estates directors are under huge pressure to reduce costs in their establishments, and therefore the drive towards putting environmental issues at the heart of the decision-making process alongside financial concerns, must be embraced by each university. No one individual can, or should, carry the burden of continually justifying such an 'invisible returns' policy, despite that policy being vital to the long-term stability and viability of the institution. Jobs have been lost over less, and it

is a fact that people think in terms of their own immediate needs, and a quick saving here or there might help a promotion case, while the long-term damage to the institution's health will not be seen for some years.

An ability to think ahead and plan for the long-term is what society would expect of the HE sector, and it also makes financial sense if a longer-term view is adopted.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

X	This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.
	This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").